DEVELOPMENT AND VALIDATION OF A NEW MEASUREMENT TOOL TO IDENTIFY CREATIVE POTENTIAL

by

AUBRA C. SHEPARD

(Under the Direction of Bonnie Cramond)

ABSTRACT

Creativity, or the ability to produce ideas, interpretations, or products that are original or surprising and useful or personally meaningful, can enable societal, workplace, and individual progress and well-being. However, research has indicated that individuals are not always supported in identifying, developing, or actualizing their creative potential, in part, because creative potential is not always readily understood or identified across a number of contexts. Furthermore, commonly used measures to identify creative potential may suffer from limitations related to construct coverage, equity in identification, or psychometric properties. This manuscript presents three validation studies for a new measure to identify trait-based creative potential, developed from a review of the empirical and theoretical literatures on creative personality and creative potential. The instrument was administered to three samples of adults: undergraduates (n = 53), Amazon Mechanical Turk workers (n = 368), and a convenience sample that was collected via snowball sampling (n = 655). The results of these studies largely supported the reliability and validity of this measure, though there were some ambiguities about factor structure that should be explored further. Simultaneous multiple regressions did indicate that dimensions of the measure differentially predicted the traits of openness to experience,

neuroticism, extraversion, conscientiousness, and agreeableness, the two aspects of the Big Five Aspect Scales openness to experience conceptualization, two sub-scales related to creative self-concept, seven domains of creative behavior, and social recognition of creative behavior differentially when the other dimensions of trait-based creative potential were controlled for. The results of these studies are explored herein, as are implications for future research, possible uses for the measure in applied settings, and its possible utility for helping individuals identify and develop their creative potential and that of others.

INDEX WORDS: Creative potential, creative personality, personality traits, creativity, creativity measurement

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by

AUBRA C. SHEPARD

BA, The Evergreen State College, 2006

MA, University of Denver, 2009

MA, Claremont Graduate University, 2015

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by

AUBRA C. SHEPARD

Major Professor:	Bonnie Cramond
Committee:	Sarah Sumners
	W. Keith Campbell
	Gary Lautenschlager
	Scott Ardoin

Electronic Version Approved:

Ron Wolcott
Interim Dean of the Graduate School
The University of Georgia
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DEDICATION

For Pop, who encouraged my creativity, provided unconditional love, and truly believed I could do anything. Thank you for the fossil hunts, trips to museums, reading me books well above my age-level, midnight snacks, allowing me to collect jar upon jar of insects, and both supporting my and coming up with your own harebrained schemes. Thank you also for the nickname Snicklefritz, which I've only literally just now learned is a term of endearment for mischievous children. For this and so many reasons, you will always be my favorite person.

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I'll be seeing you in all the old familiar places, that this heart of mine embraces all day through. I'll find you in the morning sun, and when the night is new - I'll be looking at the moon, but I'll be seeing you. - Irving Kahal and Sammy Fain, I'll be Seeing you

Power, time, gravity, love. The forces that really kick ass are all invisible. - David Mitchell, Cloud Atlas

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CHAPTER 1

RATIONALE AND OVERVIEW OF THE STUDIES

The cultivation of creative potentials is beneficial to individuals and societies (Maslow, 1943; Csikszentmihalyi, 1996). However, personality traits associated with the potential to think and behave creatively are not always recognized as such, and the expression of these traits and associated behaviors may lack support across a variety of contexts (Paek & Sumners, 2017; Paek, Sumners, & Sharpe, 2019; Sumners, Abdulla, Paek, & Runco, in press). In fact, a gap between creative potential and its expression has been identified in formal settings, such as the workplace and educational environments (Runco, Acar, & Cayirdag, 2017; Runco, Campbell, Jaeger, McCain, and Gentile, 2016; Shepard, Tadik, & Runco, 2019). Individuals report that even when creativity is expected in environments such as the workplace, adequate supports, such as thinking time, may not be provided (Gallup, 2017; Unsworth & Clegg, 2010). Generally, employees also report feeling as though their creativity is better supported in their personal lives than at work (Shepard et al., 2019). When creative potentials are not supported, individual well-being and the actualization of creative potentials may suffer (Hunter, Bedell, & Mumford, 2007; Joy, 2017). This is unfortunate, especially given research that indicates that creative potentials can be developed (Basadur, Runco, & Vega, 2000).

Failure to support creative potentials may occur for several reasons. First, creativity involves at least some degree of originality (Runco & Jaeger, 2012), which by definition diverges from the status quo. Risk-averseness in the business world, or the need to smoothly manage a classroom, may make it difficult to accommodate originality, especially if creative

ideas or behaviors are not expressed in a way that is palatable to others (Benner & Tushman, 2015; Edwards, 2001; Hodgson & Briand, 2013; Kaufman & Beghetto, 2013; Mueller, Melwani, & Goncalo, 2010). Second, creative potential and expressed creative behavior may be difficult to identify as associated with creativity (Basadur & Basadur, 2011). Lay individuals may have implicit theories about what constitutes creativity, and these implicit theories may not include the range of traits or behaviors that actually contribute to creative thought or action (Dawson, D'Andrea, Affinito, & Westby, 1999; Sumners et al., 2017; Westby & Dawson, 1995). Implicit theories may be based around myths or romantic notions about what creativity is, what creative people are like, the extent to which creativity can be developed, and whether creativity is even desirable (Cropley, 2016; Paek & Sumners, 2017; Taylor, 2017). Contextual characteristics, such as the attitudes of others toward creative behavior, may either encourage or inhibit the expression of creativity (Amabile, 1997; Hunter et al., 2007). Barron (1955) argued that if some individuals are more likely to behave originally, while some are not, then there must be a dispositional propensity for original behavior. The same can likely be said for other areas of creative potential; that there are traits that confer it (Feist, 1998). However, numerous trait-environment or person-environment theories in various disciplines of psychology indicate that although traits lower the threshold for trait-relevant behavior (Feist, 2010), situational characteristics can either facilitate or inhibit trait expression (e.g., Tett & Burnett, 2003; Woodman & Schoenfeldt, 1990).

As such, there is continued need for clearer understanding of creative potential and the various intrapersonal resources that confer it, its relationship to other constructs, as well as a targeted and comprehensive measurement tool to identify it. A better empirical understanding of creative potential can facilitate efforts toward providing education about what it entails, how it operates, what its expression might look like, and what it may take to better support it. Efforts

such as these can be used to increase creativity literacy in individuals, organizations, and communities. The term *literacy* is adopted from the health and mental health literatures. The general premise is that by receiving accurate information and resources, individuals are better able to adapt strategies to utilize supports and experience empowerment and will thus be more likely to achieve improved functioning in the given health-related area (Kutcher, Wei, & Coniglio, 2016). Through similar education provided to and through social institutions (e.g., the family, schools, the media) and subsequent understanding as a result of this education, stigma and misperceptions regarding the particular health issue or related behaviors may be decreased. Others who interact with the individual across varied environments are also able to better provide support, understanding, encouragement, and even well-informed redirection when needed (Brijnath, Protheroe, Mahtani, & Antoniades, 2016; Gillespie-Lynch et al., 2015). Given the importance of environmental characteristics to the expression of personality traits and actualization of creative potentials, similar considerations are likely relevant to the development and encouragement of creativity, especially in regard to creativity-supportive traits that may seem less socially desirable, like non-conformity.

Presently, there are measures of both creative personality characteristics and other indicators of creative potential, but though they have many strengths, a critical review of the literature for the purposes of this manuscript suggests that each of these suffers from at least one of several potential limitations : being several decades old and thus utilizing language or item content that is no longer readily recognizable or which perhaps may even be considered socially inappropriate by modern standards (e.g., Gough's use of the adjective 'sexy' on his Creative Personality Scale), requiring highly specialized training to score and interpret (e.g., indicators of creative personality derived from the Minnesota Multiphasic Personality Inventory), being

relatively short or long (e.g., the Self Report of Creative Traits and the Creative Person Profile, respectively), the presence of psychometric issues (e.g., Luescher, Barthelmess, Kim, Richter, & Mittag, 2019), failure to account for personality as a continuous variable (e.g., use of dichotomous scoring), or a focus on just one aspect of creative potential or on aspects of creative potential that may be more prevalent for men or for a particular domain of creative expression (Proudfoot, Kay, & Koval, 2015). Many commonly administered measures use overt behavioral indicators, including the frequency of behavior, when potential implies something that may not have been expressed, or the inclusion of items that reflect constructs such as ambition or perseverance, which can be problematic for the same reason. None of these limitations necessarily imply that the measures are poorly designed, just that they might not be as good as they could be for measuring creative potential or the full range of traits that can confer it.

The present series of three studies was conducted with such limitations in mind. A new measure of trait-based creative potential, the Creative Personality-Potential Composite (CP-PC) was developed and tested with both a pilot and two larger samples. A literature review and detailed discussion of measure development are provided in Chapter 2. The pilot study is described in Chapter 3 (this chapter will not be submitted for publication; instead it is included to provide more information about the pilot study). Chapter 4 is written in a format appropriate for publication. With journal space limitations in mind, it only briefly describes the pilot, and instead focuses primarily on Study Two. Chapter 5 is also written in the format of a publishable article and discusses how the refined measure was again subjected to empirical testing in a third study.

A unique component of measure development was the consideration that individuals may respond to survey items in context-specific ways. As noted above, contexts will influence the extent to which potential is expressed, which could introduce context-related error into a measure

that should, in theory, be targeting individual differences and not environmental effects. Instructions for the CP-PC request that respondents consider who they are in a context-free manner when responding to items; the rationale for this is discussed in more detail in the following chapters. Question anchors are also worded in a way that is meant to be self-relevant, as opposed to measuring the frequency of behavior.

The primary focus of all studies was on measure validation, and so there was one guiding research question throughout: What are the psychometric properties of the CP-PC? This question addressed the empirical science of measuring creating potential, with a focus on providing evidence to support arguments pertaining to the reliability, validity, and dimensionality of the measure (Bandalos, 2018). Across the studies, both planned and exploratory analyses were conducted to answer the research question and to probe deeper into understanding the CP-PC when other analyses indicated that this was appropriate. With each sample, common approaches to examine reliability were utilized: calculation of Cronbach's alpha and corrected item-total correlations to look at the internal consistency of the items and measure as a whole, as well as factor analysis to examine the extent to which the CP-PC might also capture multiple dimensions of creative potential (in comparison to the use of the sum scores of all CP-PC items). Validity was investigated through several approaches as well: a review of the relevant research literature and existing related measures, expert review of items, examination of bivariate correlations between the CP-PC and measures of both related and dissimilar constructs, estimation of the predictive validity of the CP-PC in hierarchical multiple regressions, comparison of exploratory and confirmatory factor analysis results to the existing research literature, simultaneous multiple regressions using CP-PC subscales derived from the factor analyses to predict a range of creativity and personality-specific variables, and exploratory moderation analyses. Although

validity is often divided into multiple sub-conceptualizations (e.g., construct, content, and criterion), investigations of validity often address several areas of concern at once, with some psychometricians arguing that all types of validity can be subsumed under the broad umbrella of construct validity (Bandalos, 2018). So, although these more piecemeal terms are referenced so that readers can easily understand that these traditional conceptualizations of validity were afforded due consideration, it will likely be quite easy to see how the various analyses might provide support for different types of validity. The results of the three studies are discussed in terms of implications for continued development and validation of the CP-PC, the measurement and understanding of trait-based creative potential in general, and the ways in which this information might be applied to aid public understanding and practice outside of the metaphorical laboratory; this discussion is summarized in Chapter 6.

References

Amabile, T. M. (1997). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review, 40,* 39–58. https://doi.org/10.2307/41165921

Bandalos, D. L. (2018). *Methodology in the social sciences. Measurement theory and applications for the social sciences.* New York, NY, US: Guilford Press.

Barron, F. (1955). The disposition toward originality. *The Journal of Abnormal and Social Psychology, 51,* 478-485. https://doi.org/10.1037/h0048073

Basadur, M., & Basadur, T. (2011). Where are the generators?. *Psychology of Aesthetics, Creativity, and the Arts, 5,* 29-42. https://doi.org/10.1037/a0017757

Basadur, M., Runco, M. A., & Vega, L. A. (2000). Understanding how creative thinking skills, attitudes and behaviors work together: A causal process model. *The Journal of Creative Behavior, 34,* 77–100. https://doi.org/10.1002/j.2162-6057.2000.tb01203.x

Benner, M. J., & Tushman, M. L. (2015). Reflections on the 2013 decade award—'Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited' ten years later. *The Academy of Management Review, 40,* 497-514. https://doi.org/10.5465/amr.2015.0042

Brijnath, B., Protheroe, J., Mahtani, K. R., & Antoniades, J. (2016). Do Web-based Mental Health Literacy Interventions Improve the Mental Health Literacy of Adult Consumers? Results from a Systematic Review. *Journal of Medical Internet Research, 18*(6), e165. https://doi.org/10.2196/jmir.5463

Cropley, A. (2016). The myths of heaven-sent creativity: Toward a perhaps less democratic but

more down-to-earth understanding. *Creativity Research Journal*, *28*, 238-246. https://doi.org/10.1080/10400419.2016.1195614

Csikszentmihalyi, M. (1996). *Creativity: The psychology of discovery and invention*. New York, NY, US: HarperCollins Publishers.

Dawson, V. L., D'Andrea, T., Affinito, R., & Westby, E. L. (1999). Predicting creative behavior: A reexamination of the divergence between traditional and teacher-defined concepts of creativity. *Creativity Research Journal*, *12*, 57-66. https://doi.org/10.1207/s15326934crj1201_7

Edwards, S. M. (2001). The technology paradox: Efficiency versus creativity. Creativity *Research Journal*, *13*, 221-228. https://doi.org/10.1207/S15326934CRJ1302_9

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, *2*, 290-309. https://doi.org/10.1207/s15327957pspr0204_5

Feist, G. J. (2010). The function of personality in creativity: The nature and nurture of the creative personality. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 113-130). New York, NY, US: Cambridge University Press. https://doi.org/10.1017/CBO9780511763205.009plucker

Gallup Organization. (2017). *American workplace survey*. Washington, D.C: Gallup Organization.

Gillespie-Lynch, K., Brooks, P. J., Someki, F., Obeid, R., Shane-Simpson, C., Kapp, S. K., ... & Smith, D. S. (2015). Changing college students' conceptions of autism: An online training to increase knowledge and decrease stigma. *Journal of Autism and Developmental Disorders*, *45*, 2553-2566. https://doi.org/10.1007/s10803-015-2422-9

Gough, H. G. (1979). A Creative Personality Scale for the Adjective Check List. *Journal of Personality and Social Psychology, 37,* 1398–1405. https://doi.org/10.1037/0022-3514.37.8.1398

Hodgson, D., & Briand, L. (2013). Controlling the uncontrollable: 'Agile' teams and illusions of autonomy in creative work. *Work, Employment and Society*, *27,* 308-325. https://doi.org/10.1177/0950017012460315

Hunter, S. T., Bedell, K. E., & Mumford, M. D. (2007). Climate for creativity: A quantitative review. *Creativity Research Journal, 19,* 69-90. https://doi.org/10.1080/10400410709336883

Joy, S. (2017). Innovation Motivation. In G. Feist, R. Reiter-Palmon, & J. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (Cambridge Handbooks in Psychology, pp. 214-234). Cambridge: Cambridge University Press. https://doi.org/10.1017/9781316228036.012

Kaufman, J. C., & Beghetto, R. A. (2013). In praise of Clark Kent: Creative metacognition and the importance of teaching kids when (not) to be creative. *Roeper Review: A Journal on Gifted Education, 35,* 155-165. https://doi.org/10.1080/02783193.2013.799413

Kutcher, S., Wei, Y., & Coniglio, C. (2016). Mental health literacy: Past, present, and future. *Canadian Journal of Psychiatry*, *61,* 154–158. https:/doi.org/10.1177/0706743715616609

Luescher, R., Barthelmess, P. Y., Kim, S., Richter, U. H., & Mittag, M. (2019). Conceptualizing creativity: General and cultural biases in Gough's Creative Personality Scale. *The Journal of Creative Behavior*, *53*(1), 30–43. https://doi-org/10.1002/jocb.160

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50,* 370-396. https://doi.org/10.1037/h0054346

Mueller, J. S., Melwani, S., & Goncalo, J. A. (2012). The bias against creativity: Why people desire but reject creative ideas. *Psychological Science*, *23*, 13–17. https://doi.org/10.1177/0956797611421018

Paek, S. H., & Sumners, S. E. (2017). The indirect effect of teachers' creative mindsets on teaching creativity. *The Journal of Creative Behavior*. https://doi.org/10.1002/jocb.180

Paek, S., Sumners, S., & Sharpe, D. (2019). Teachers' beliefs of creative children. *The Journal of Creative Behavior*. https://doi.org/10.1002/jocb.400

Proudfoot, D., Kay, A. C., & Koval, C. Z. (2015). A gender bias in the attribution of creativity: Archival and experimental evidence for the perceived association between masculinity and creative thinking. *Psychological Science*, *26*, 1751-1761. https://doi.org/10.1177/0956797615598739

Runco, M. A., Acar, S., & Cayirdag, N. (2017). A closer look at the creativity gap and why students are less creative at school than outside of school. *Thinking Skills and Creativity, 24*, 242-249. https://doi.org/10.1016/j.tsc.2017.04.003

Runco, M. A., Campbell, W. K., Jaeger, G., McCain, J., & Gentile, B. (2016). Comparisons of the creative class and regional creativity with perceptions of community support and community barriers. *Business Creativity and the Creative Economy, 2*(1), 24–32. https://doi.org/10.18536/bcce.2016.06.2.1.04

Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal*, *24*, 92-96. doi:10.1080/10400419.2012.650092

Runco, M. A., Plucker, J. A., & Lim, W. (2001). Development and psychometric integrity of a measure of ideational behavior. *Creativity Research Journal, 13*, 393-400. https://doi.org/10.1207/S15326934CRJ1334_16

Shepard, A., Tadik, H., & Runco, M.A. (2019). How much creative potential is expressed at work? Manuscript submitted for publication.

Sumners, S., Abdulla, A., Paek, S., & Runco, M. (2019). *Creativity, what it is and what it is not: A study of implicit theories.* Manuscript submitted for publication.

Taylor, C. L. (2017). Creativity and mood disorder: A systematic review and meta-analysis. *Perspectives on Psychological Science*, *12*, 1040-1076. https://doi.org/10.1177/1745691617699653

Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, *88*, 500–517. https://doi.org/10.1037/0021-9010.88.3.500

Unsworth, K. L., & Clegg, C. W. (2010). Why do employees undertake creative action?. *Journal of Occupational and Organizational Psychology*, *83*, 77-99. https://doi.org/10.1348/096317908X398377

Westby, E. L., & Dawson, V. L. (1995). Creativity: Asset or burden in the classroom?. *Creativity Research Journal*, *8*, 1-10. https://doi.org/10.1207/s15326934crj0801_1

Woodman, R. W., & Schoenfeldt, L. F. (1990). An interactionist model of creative behavior. *The Journal of Creative Behavior*, *24*, 279-290. https://doi.org/10.1002/j.2162-6057.1990.tb00525.x

CHAPTER 2

LITERATURE REVIEW AND EXPLANATION OF MEASURE DEVELOPMENT

Creative Personality

According to Costa, McCrae, and Kay (1995), personality refers to "the relatively enduring styles of thinking, feeling, and acting that characterize an individual" (p. 124). Personality traits, as constructs, cannot be directly observed, but can be inferred based on how people tend to think, feel, and act (Feist, 1999a). Findings in the domain of personality psychology tend to be robust compared to other sub-fields of the discipline (Soto, in press). Understanding personality has typically involved the examination of stable patterns which encompass both behavioral consistency and individual differences (Feist, 1999a). Behavioral consistency is the extent to which individuals act in the same way across time (temporal consistency) and different situations (situational consistency), while individual differences are the extent to which traits vary from person to person. More recently, trait-activation theory and other theoretical and empirical perspectives have called into question the stability of traits across different contexts, making a strong case for variability of trait expression within individuals depending on contextual variables (Jayawickreme, Zachry, & Fleeson, 2019; Judge & Zapata, 2015; Madrid & Patterson, 2016; Tett & Burnett, 2003; Tett & Gutterman, 2000).

To be creative, an idea, action, or product should be in some way original and either effective or personally meaningful (Runco & Jaeger, 2012). Barron (1955) pointed out that "If...some persons are regularly original, while others are regularly unoriginal, it must be the case that certain patterns of relatively enduring traits either facilitate or impede the production of

original acts" (p.478). He was, in this instance, referring to traits that make creativity more likely. Personality has been identified as a causal factor in creative thought and behavior, because associated traits, thought, and behavior covary, and because temporal precedence has been established (Feist, 1999a). Personality traits, including those related to creativity, are determined by a variety of sequelae, including that which is genetic, epigenetic, and environmental (Eysenck, 1993; Feist, 2010; Kandler, Riemann, Angleitner, Spinath, Borkenau, & Penke, 2016). Heritability estimates of creative personality are similar to other traits, falling between 27 and 36 percent. However, creative personality cannot be fully explained by the five-factor model (Kandler et al., 2016) or other similarly broad conceptualizations of personality (Martinsen, 2011). The same traits that confer creative potential tend to be similar across age groups (Feist, 2010), though their expression may vary based on life events and other environmental factors (Helson, 1999).

It is widely accepted that creative personality is best conceptualized as a set of traits; there is no single trait that makes one a creative person, and individuals typically will not have *all* of the traits that can confer potential for creative thought or behavior (Hocevar, 1981; Martinsen, 2011). The antecedents, correlates, and components of the creativity gestält have been referred to as syndrome or complex (Albert & Runco, 1989; MacKinnon, 1962; Mumford & Gustafson, 1988). Runco, Nemiro, & Walberg (1998) stated that "creativity does not seem to be assigned to one specific cognitive, affective, social, or physical realm, but can instead draw on each" (p.15). In this way, creativity is over-determined, meaning that it has many potential influences (Runco, 2004).

Creative personality has been conceptualized as a combination of cognitive, motivational-affective, social, and clinical traits that have physiological underpinnings and are

also influenced by environments in both stable and dynamic ways (Benedek, Jauk, Sommer, Arendasy, & Neubauer, 2014; Feist, 2010; Khalil, Godde, & Karim, 2019). These traits function together to lower the threshold for the occurrence of creative thought or action (Feist, 2010). According to Feist, cognitive traits, including openness to experience, are those which relate to information processing, problem-solving, and responding to new situations. Social traits include those that reflect dispositions toward interacting with and viewing other people. These include the propensity to view authority figures in particular ways, the degree of experienced discomfort when around others, and the degree of warmth felt toward others. Motivational-affective traits reflect an individual's trait-level desire to persist and be successful in activities. Clinical personality traits, or trait constellations, are those that are related to creative ability or behavior and can also be representative of mental health, such as psychoticism or hypomania.

Various traits and clusters of traits have indeed appeared consistently in the research literature on creative personality, including openness to experience (Furnham, 2017), those that can be categorized under the broader heading of non-conformity, such as non-adherence to norms, independence of judgement, and a desire to break boundaries (Helson, Roberts, & Agronick, 1995; Collins & Amabile, 1999), and the tendency to think originally and fluently and make remote connections between seemingly disparate ideas (Lubart, Zenasni, & Barbot, 2013). Barron and Harrington (1981) reviewed early research on creative personalities, and cited the following characteristics as being representative: "high valuation of esthetic qualities in experiences, broad interests, attraction to complexity, high energy, independence of judgement, autonomy, intuition, ability to resolve antinomies or to accommodate apparently opposite or conflicting traits in one's self-concept, and finally, a firm sense of one's self as creative" (p. 453).

There have also been a number of domain-specific investigations related to personality traits of creative individuals. For example, MacKinnon (1965) found that highly creative architects scored lower than less creative groups on measures of socialization and the number of organizations they belonged to, and instead had high scores on scales of autonomy and aggression. The least creative architects cared more about meeting industry standards than their own standards, while the second most creative group cared about skill development and execution, and the most creative group valued their own standards most highly. In terms of psychological processes, the two most creative groups scored higher than the least on scales of psychological mindedness, flexibility, and femininity, among others. Feist (1998, 1999a) examined traits that form the larger construct of creative personality for artists and scientists. Non-social personality components of highly creative artists included openness to fantasy, experience, and imagination, impulsivity and a lack of conscientiousness, anxiety, affective illness and emotional sensitivity, drive, and ambition. Social characteristics included norm-doubting, non-conformity, independence, hostility, aloofness, unfriendliness, a lack of warmth, and introversion. Feist did mention some conflicting findings regarding affective symptomatology in artistically creative individuals, as well as some inconsistent results pertaining to introversion versus extroversion. Creative scientists, on the other hand, were characterized by openness to experience, flexibility of thought, drive, ambition, achievement, dominance, aggression, hostility, confidence, autonomy, introversion, and independence. Simonton (2017) has pointed out that job-roles in some domains, such as laboratory science, may necessitate more emotional stability, and Getzels and Jackson (1962) noted that individuals who are more skilled in convergent thinking may gravitate toward creativity in the sciences more so than the arts. Although highly creative artists may be more prone to intense affective

experiences, the creativity of scientists still benefits from their sensitivity to environments to identify new problems and understand unexpected but potentially fruitful developments in their work (Root-Bernstein, 1988; Simonton, 2015). Still, it is important to note that there are some traits that may better confer potential in one domain compared to others, as this has apparently resulted in a number of inconsistent findings in trait-research across the decades (Furnham, 2017).

Intersection of Creative Personality and Potential

As can be seen, there are a number of constructs that come together to form creative personality and capacities that support the potential for developing creatively, including conative, cognitive, attitudinal, and stylistic abilities, tendencies, and dispositions. Martinsen (2011) asserted that "within the domain of personality, the conceptual picture seems…fragmented as there are a number of potentially relevant constructs that must be measured by numerous tests, inventories, and questionnaires to obtain the full picture" (p. 186). Researchers have found or theorized that creativity supportive traits, behaviors, attitudes, and thinking skills work together synergistically (Brown, 1989; Basadur, Runco, & Vega, 2000; Torrance, 1979; Woodman & Schoenfeldt, 1990). However, separating a given trait into one mutually exclusive category or another can pose some difficulty. Flexibility, for example, can be conceptualized as either a cognitive process or trait (Runco, 2007); one can either think or be inclined to live or behave in a flexible or adaptive manner. Runco and Chand (1995) described cognitive styles, or the way individuals react to situations or experiences, as a bridge between cognition and personality. Selby, Shaw, and Houtz (2005) noted the importance of both cognitive processing and problem-solving styles, while Fürst, Ghisletta, & Lubart (2016) have suggested an integration of traits and cognitive processes, with a specific emphasis on the processes of idea

generation and selection. Basadur and Basadur (2011) reviewed four types of creative problem-solving approaches: generation, conceptualization, optimization, and implementation. The preference for each may be trait and skill-based, with generators appearing the least frequently in most professional fields. Generators tend to seek new problems to solve, conceptualizers find and structure problems, optimizers evaluate and select ideas, and implementers take action to put ideas into practice. Another illustrative example of the diverse capacities that might contribute to creativity is Kirton's (1976) proposition that there two personality-based styles used to approach decision-making in regard to creativity. Being an *adapter* indicates that an individual tends to be detail-oriented, wants to create within established norms, and is systematic when approaching tasks, while being an *innovator* involves having many ideas, a tendency to speak up against the status quo, and a preference for frequent change. All this to say, the line of demarcation between traits, cognitive processes, and other higher-level conceptualizations (e.g., problem-approaches) is somewhat blurred, including the extent to which each should be placed on a state-trait continuum. The work of Feist (1998) for example would seem to suggest that generally, cognition should be considered part of the broader creative personality complex, as he has discussed elsewhere (Feist, 2010).

Similarly, traits have often been conceptualized as distinct from interests and abilities (Costa & McCrae, 1995), but interest and ability may still matter when considering creative individuals and creative potential (Davis, Keegan, & Gruber, 2012). Having certain knowledge, skills, interests, or abilities can confer benefit to creativity, especially when an individual learns to apply these in ways that allow for identifying gaps and problems, developing unique understandings, using multiple perspectives to problem-solve, re-organizing problem elements, and avoiding functional fixedness, whether generally or in specific domains (Mumford, &

Gustafson, 1988; Runco & Chand, 1995). Individuals who are creative may have a particular domain or multiple domains of work or play in which they are passionately interested; this may convey a higher propensity for continued creative development, for example (Davis et al., 2012). Interest may also facilitate the development of creativity-relevant skills or dispositions, such as problem-finding and sensitivity to problems (Feist, 1999a). This again should indicate creative potential. Furthermore, creativity-supportive attitudes and lifestyle choices also appear to confer potential for creativity (Acar & Runco, 2015; Davis, 1999; Ivcevic & Mayer, 2009; Sternberg, Kaufman, & Roberts, 2019). Lifestyle choices have been conceptualized as a part of everyday creativity and being creative has been discussed as a sort of lifestyle itself (Grand, 2016; Sternberg et al., 2019). This would also seem to indicate some sort of stable favorable attitude or tendency toward creativity, likely relevant to considerations of trait-based creative potential. In fact, Jay and Perkins (1997) argued, in the context of problem-finding, that there was a need for additional research to determine the extent to which capacities for creativity were also dispositional; their view was that dispositions toward acting in certain ways could serve as a mechanism for why behaviors associated with creativity occur for some individuals with creativity-supportive abilities and not others. In somewhat of contrast to the second part of this perspective, I will argue that it also may be that there are barriers to individuals expressing such dispositions; one can have a proclivity to behave in a certain way and still not do it. Taken as a whole, the preceding information paints a complex backdrop of the study of creative personality, especially in terms of integrating multiple related constructs across various conceptual categories, some of which may be more trait-like than others, in identifying creative potential that is dispositional.

Of course, the complexity noted so far has been illustrated elsewhere. Martinsen (2011), for example, integrated style, motivational, and trait components from the creativity research literature into one comprehensive trait-focused measure, The Creative Person Profile (CPP). He identified 42 relevant constructs and retained the following after piloting items for each: curiosity, need for recognition, autonomy, need for status, willingness to take risks, achievement motives, goal orientation, persistence, mood swings, neuroticism, impersonal orientation, playfulness, assertiveness, conceptual boundaries, dominance, exhibitionism, absorption, openness for the unusual, friendliness, self-confidence, fantasy, extraversion, rule orientation, tolerance for ambiguity, orientation toward usefulness, opposition against conventions, novelty-seeking, self-knowledge, talent, low rigidity, need to create, complexity, preference for complexity, critical attitude, transformational capacity, ideational capacity, restructuring tendency, and conscience. Items targeting these constructs formed seven factors: affective instability, associative orientation, agreeableness, motivation, flexibility, ambition, and need for originality. Upon further testing, overarching factors of associative orientation and flexibility were most consistently related to criterion variables. Similarly, Fürst and Lubart (2017) wanted to streamline creative personality-relevant information, but into a cohesive theoretical model as opposed to a measure. Their conceptualization of creative personality was that the construct is complex and made up of a number of traits that are characteristic of individuals that produce creative work. Their model integrated several approaches to personality research, at multiple levels of analysis and specificity. They developed two overarching headings to categorize findings: rational and chaotic. Rational traits are those that enable actions often found in later stages of creative processes (e.g., elaboration, convergent thinking), while chaotic traits are those having to do with success in earlier stages, such as divergence, ideation, and thinking based in

loose, automatic processing. They proposed that, in terms of expressed creative behavior, creativity lies somewhere between the rational and the chaotic. They further specified that these dimensions of order and chaos can be found across constructs related to affect, cognition, personality, cognitive styles, self-monitoring, processing depth, and motivation.

Looking more explicitly at potential for creative achievement, Runco, Nemiro, and Walberg (1998) surveyed creativity researchers on their implicit theories of what was most important. Though this work did not focus on developing a measure or offering a taxonomy, the areas about which they inquired provide valuable information about the things that might constitute creative potential. The items presented to the researchers fell under a number of categories. These included motivation (e.g., joy in work, perseverance, ambition), problem-finding/questioning (e.g., questioning assumptions, finding order in chaos, alert to novelty), adaptive cognition (e.g., originality, imagination, insightfulness), risk-taking (e.g., will take risks, adventurousness, assertiveness), knowledge (e.g., builds new structures, alert to gaps in knowledge, knowledge base), adaptive personality (e.g., curiosity, alertness, strong will), conventional cognition (e.g., precociousness, clever, skilled decision-maker), and independence (e.g., questions conventions, individualism, rebelliousness). Sternberg and Lubart (1991, 1992, 1995) have proposed a formal theory of *resources* contributing to creativity, which separates personality from motivation, intelligence, knowledge, intellectual styles, and environment. Torrance (1979) devoted a book to the abilities that, through his research, he identified as being important to creativity. Among these abilities were being able to identify the essence of problems, being able to produce many ideas and consider alternatives, being original and breaking away from habits in thinking, being able to integrate seemingly incompatible components of ideas within a given situation, being able to develop and add detail to ideas,

resistance to premature closure, having emotional awareness and expressing emotions and passion or interest, viewing familiar things in a new light, asking big questions, understanding the larger picture, putting concepts together in meaningful ways, seeking to understand connections between concepts, being able to develop rich internal visual imagery, being able to imagine new possibilities and enjoying thinking in a fantastical manner, being able to extend and break through conceptual boundaries, using humor and playfulness, and glimpsing infinity, or being existentially sensitive and open to all that is possible both in the present and future. Torrance's body of work is notable, as it involved longitudinal studies of individuals, beginning when they were young children. It has provided insight into how creative potential is displayed developmentally, and how it relates to personal and achievement-based creative outcomes over time (e.g., Torrance, 1980, 1981; Runco, Millar, Acar, & Cramond, 2010).

Research is also complicated by the fact that although there may be traits that are fairly consistent across creative individuals, there are, as mentioned, those that may better confer potential in specific domains. For example, Barbara Kerr and colleagues (e.g., Kerr & McKay, 2010; Kerr & Vuyk, 2013) have investigated typologies of creatively gifted adolescents, particularly in relation to career counseling. This work is notable because it explicitly focuses on the identification of individuals who might not be easily identified as creative - in other words, those whose potential might be missed. They found that some groups of students shared many of the more stereotypical creative personality traits highlighted earlier while others did not. For example, creative *helpers* were higher in agreeableness and conscientiousness and lower in dominance and aggression, and they thought carefully before acting. This is a contrast to some of the characteristics already mentioned, of creative artists and scientists. Silvia, Nusbaum, Berg, Martin, and O'Connor (2009) have also found that conscientiousness is related to *empathetic*-

interpersonal creativity. According to Kerr & McKay, creative *inventors* were conscientious, less fantasy-prone, lower in extroversion, and made careful plans. Research such as this brings to attention the need to consider different trait-based paths to creativity when developing measures of creative potential. A measure that only focused on radical creativity and failed to include items that could tap into more conscientious and less impulsive or risky paths to creative action would likely miss the potential of some individuals. In fact, Dawson, D'Andrea, Affinito, & Westby (1999) stated that "notions of the nonconformist creative rebel may be a part of some creative personalities, it need not be the defining feature of the creative individual" (p. 65). Although non-conformity in *some* respect is probably required for creativity, the intensity of the degree of non-conformity required and the extent to which is can exist alongside other more prosocial traits (and just when those prosocial traits might become antithetical to creative potential) poses more complicated questions.

Indeed, both complementing this idea and even further complicating the measure of creative potential, Barron (1957; 1963) explained how his research had led him to believe that creative individuals may be high on both ends of what are usually considered bipolar spectra; they may alternate between naivete and knowledge, primary processes and logic, primitivism and cultural refinement, a proclivity to be constructive and destructive, and experience both more and less psychological and emotional adjustment than the average person. In spite of this sentiment practically being an axiom in creative personality research (it is frequently referenced), stereotypically socially desirable components have, traditionally, been less accounted for in personality assessment when it comes to creativity. This may be because some of these traits have weaker and more inconsistent overall relationships with creative behavior or success (Feist, 1998), or because capacities for divergence are probably more important to originality than those

associated with convergence or conformity, and originality is an integral part of creativity (Acar & Runco, 2015; Runco & Jaeger, 2012). Still, Cropley (2006) also argued that rational or convergent processes do have their place in regard to the expression of creativity. Westby and Dawson (1995) speculated that individuals who are high in both characteristics associated with stereotypical bohemian perceptions of creativity *and* traits that are probably aligned with convergence, such as being industrious, deliberate, and reserved, may be especially adaptable to the social or behavioral requirements related to the expression of creativity in different contexts. Similarly, Feist (1999), like Barron (1957), pointed out that for creative endeavors to be successful, some traits or trait-clusters associated with creativity, such as psychoticism and low latent inhibition, must also be tempered by a degree of self-control and ego-strength. He too noted that such paradoxical combinations would likely confer benefit to creativity.

Measurement of Creative Personality and Potential

Since Guilford's (1950) landmark address to the American Psychological Association, creativity has received an increased amount of attention from scholars. Typically, the study of creativity has fallen under one or more of four overarching areas; the creative person, creative products, environmental influences on creativity, or creative processes (Rhodes, 1961). More recently, Simonton (1990) suggested adding persuasion as a category of focus, and Runco (2007) has suggested the inclusion of potential, under which personality, cognitive processes, and environmental influences are subsumed. This is so potential can be separated out from actualized creativity, which tends to take the form of tangible products or observable success. There are presently a number of instruments to assess creativity-specific constructs within each area, each targeting "distinct aspects of the phenomena" (Barbot, Hass, Reiter-Palmon, 2019, p. 234). However, Barbot et al. noted that no clear taxonomy of accepted measures in the field exists, and

Kaufman (2019) pointed out that many creativity measures are not used in more than a handful of studies, if that.

Creative potential is an important area of focus that should be considered in attempts to assess creativity (Runco, 2007, 2008; Runco & Cayirdag, 2012). Measurement of creative potential can typically be categorized as either production-based, in which individuals are asked to actually do something creative, such as taking a test of divergent thinking or completing domain-specific tasks, or resource-based, which involves assessing conative and cognitive factors that contribute to creative work, without requiring performance or product creation (Lubart, Zenasni, & Barbot, 2013). Lubart et al. suggested several such resources to be assessed: divergent thinking, analytic thinking, mental flexibility, associative thinking, selective combination, tolerance for ambiguity, risk-taking, openness, intuitive thinking, and motivation to create.

Creative personality appears to have been measured most frequently by the use of an adjective checklist approach. Such self-report assessments are meant to ascertain self-views which reflect personality by asking participants to indicate whether various adjectives describe them. The adjectives have, of course, been selected to reflect traits indicative of creative personality, and by virtue of traits lowering the threshold for behavior, creative potential to at least some extent. Multiple researchers have developed scales from the 300-item Adjective Checklist (ACL; Gough & Heilburn, 1965, as reviewed in Gough, 1979 and Domino, 1994). During this time period, researchers also derived measures of creative personality from other well-established personality instruments, including the MMPI and the 16PF (described in Barron & Harrington, 1981). A limitation of these measures is that development often focused on samples of individuals who had already displayed quite a high degree of creative ability and

social recognition for their creative pursuits (Helson, 1996). Early creative personality research also tended to focus on samples of men (Helson, 1996), with Barron (1957) proposing that "it is noteworthy that as an historical fact intellectual creativity has been conspicuously lacking in women, whose products are their children" (p.737). Later research elucidated that rather than suffering from a lack of creative potential, women may be subject to different social pressures, stereotypes, and judgements in regard to being perceived as creative or expressing creative behavior, even if such behavior is similar in character or quality to that of men (Foss, Woll, & Moilanen, 2013; Proudfoot, Kay, & Koval, 2015; Lebuda & Karwowski, 2013; Mockros & Csikszentmihalyi, 2014). Neurological research on creative performance has indicated the men and women perform similarly in terms of originality and fluency, though there may be differences in the patterns of brain activation and problem-approaches between men and women while completing creative tasks (Abraham, 2016). Among some of the differences noted were that men tended to engage brain regions associated with rule learning, while women had greater activation in areas associated with social perception. This may have implications for measurement, both in terms of construct coverage and consideration of sample composition, given stereotypes that creative individuals are isolated and antisocial, as well as past research findings that being highly creative involves also being domineering and less socially conscious (e.g., Feist, 1998).

Gough's (1979) Creative Personality Scale (CPS), constructed from the ACL, appears to be the most commonly used trait measure in research, not only in recent decades, but also at present. This instrument contains thirty adjectives. Participants are tasked to select the adjectives that they believe apply to them; response options are dichotomous. One point is awarded for each adjective selected that is indicative of creativity (capable, snobbish, individualistic,

unconventional, egotistical, insightful, self-confident, resourceful, sexy, inventive, intelligent, wide interests, original, informal, humorous, reflective, confident, clever), and one point is subtracted for each adjective selected that is negatively related to creativity (well-mannered, sincere, honest, cautious, conventional, suspicious, conservative, commonplace, submissive, narrow-interests, dissatisfied, artificial).

Davis (1975; Davis & Subkoviak, 1975) constructed a commonly used measure of creative potential called How Do You Think? (HDYT), which consists of 102 items rated on a five-point Likert scale. This measure treats potential as a composite of motivations, behaviors, attitudes, and affective responses. Activities in several domains of creative behavior are also queried. The twelve-item Self Report of Creative Traits (SRCT; Runco, Acar, & Cayirdag, 2017) is a trait measure that was developed from the HDYT and does not include items that query behavior in specific domains. On the SRCT, respondents are asked to indicate how often they are flexible, habitual, original, spontaneous, typical, creative, a non-conformist, unoriginal, authentic, mindful, conventional, and different, on a five-point Likert scale. Items which do not reflect a creative personality are reverse-scored.

Some psychometric concerns have been reported in the literature, particularly concerning the factor structure of measures that have been used to assess creative personality, such as Cattell's 16PF, as well as whether all of the CPS items are actually scored in the correct direction (Zampetakis, 2010). A recent study has also proposed that the CPS is biased in several ways, both psychometrically and in terms of failing to accurately reflect individuals who, again, may be creative in different ways (Luescher, Barthelmess, Kim, Richter, & Mittag, 2019). Furthermore, the CPS, which is again the most widely used measure, is pay-per-use, which may create barriers to access for researchers with limited funding. This may especially be problematic

given recent attention to small sample sizes in light of poor reproducibility of findings in multiple sub-domains of psychology (Maxwell, Lau, & Howard, 2015); using funds for measurement tools may mean less funds available to compensate participants. The Creative Person Profile (CPP; Martinsen, 2011), already discussed, is quite comprehensive but is long at 216 items (Martinsen, Arnulf, Furnham, Lang Re, 2019). It also focuses partly on ambition (e.g., need for achievement, persistence) and motivation (e.g., need for recognition) which may make it, overall, a better indicator of potential for creative success than just trait-based potential, per se.

To elaborate on the last point, Runco (2007) has suggested that potential should be viewed as separate from actual creative behavior, as the actualization of potential can depend on a number of intrapersonal and environmental factors and their interactions (Amabile, 1983; Beghetto, 2014; Eysenck, 1993; Runco, 2016; Said-Metwaly, Van den Noortgate, & Kyndt, 2017). Torrance (2000) said that he would "never argue that the possession of (creative) abilities guarantees that an individual will behave creatively, any more than a high degree of intelligence guarantees intelligent behavior" (p. 1). Such considerations should frame the measurement of creative potential; attempts to measure resource-based potential, especially, should involve consideration of a variety of contingencies that may be slightly more idiographic in nature. Such contingencies include that individuals with creative potential may not have experienced creativity-supportive environments or opportunities to develop creatively, may not have found creative interests, or may suffer from physical or psychological disabilities that may impair energy and thus the ability to fully actualize potential. It may also be the case that even those with creative potential have been told too many times that their original ideas are strange or received similar discouraging criticism that can inhibit the expression of potential (Beghetto,

2014). McCall (2010) made a similar point in the realm of leadership development when he said,

> ...although many things can be done to increase learning, the assumption is that the truly talented will figure it out without any help…[but] there is no mechanism for discovering if those who did not 'land on their feet' might have developed if only they had had some help" (p. 7).

Similarly, Zhang & Sternberg (2011) have pointed out that "without an environment that is supportive of creativity and rewarding of creative ideas, the creativity that an individual has within him or her might never be displayed. Creativity needs to be nurtured" (p. 231). Accordingly, recent research (Runco, Acar, & Cayirdag 2016; Shepard, Runco, & Tadik, 2019) has focused on investigating this issue, identifying gaps between creative potential and creative behavior across different environments. This research has indicated that expression of potential is indeed variable across environments and that individuals also vary in the extent to where and with whom they are most likely to express behavior that is trait-relevant to creativity. This is supported by other personality research, which has indicated that though there is rank-order stability in personality, individuals will respond differently to trait-based measures when asked to consider different life domains, such as the domain of work or the domain of romantic relationships (Lievans, Lang, De Fruyt, Corstjens, Van de Vijver, & Bledow, 2018). Other work has indicated differences in self-perceived creativity at school, work, and as a hobby, with the mean for a general creative self-perception falling between the mean ratings for work and as a hobby (Reiter-Palmon, Robinson-Morral, Kaufman, & Santo, 2012).

Runco (2004, 2015a) and Eysenck (1993) likewise stated that creative potential and creative performance are not the same; there are discrepancies between potential and

performance, and there will be error associated with the extent to which performance indicates whether the full extent of an individual's potential is being actualized, if at all. Richards (2007), referring to the longitudinal study of creative behavior undertaken by her and her colleagues, also provided examples of several barriers to the expression of creativity: self-criticism, fear of emotions or thoughts that come with creative expression, concern that behaving creatively is associated with poor mental health, lack of acceptance or misunderstanding of creative behavior by authority figures, and suppression of creativity or criticism by peer groups. Davis (1999) similarly outlined a number of barriers to creative attitudes and expression, including previous learning, habits, rules, and traditions, as well as barriers that are cultural, psychological, emotional, and resource related. von Stumm, Chung, & Furnham (2011) have pointed out that there are differences between what people can do (maximum performance), and what they tend to do (typical performance); traits other than those directly relevant to having creative potential, such as extraversion, may provide a bridge between individuals' creative potential and actual creative behavior. Although it has been argued that assessment of personality should reflect typical behavior (Cronbach, 1949), I argue that consideration of trait-based *potential* should reflect the individual's capacity for trait-endorsement regardless of whether it is typically expressed.

There is additional evidence to support that contingencies matter when it comes to expressing creative behavior and doing so successfully. For example, von Stumm et al. (2011) found evidence that extraversion plays a role in higher levels of creative *achievement*, even for everyday creativity. They also found that traits that confer high energy and persistence may be related to creative *accomplishment* but not creative *ability*. Other research has identified that inspiration, for example, has more to do with the *actual* creativity of a product than does effort

(Thrash, Maruskin, Cassidy, Fryer, & Ryan., 2010). Creative success can also involve luck or chance in addition to ability and hard work (Simonton, 2004). In a review of 96 studies, Puryear, Kettler, & Rinn (2017) found that conscientiousness was positively predictive of measures of creative *production*, but negatively related to measures of *potential*. Extraversion was again significantly related to production but not potential. Puryear et al. also found that neuroticism was unrelated to creative potential, but negatively associated with production. This body of research provides additional support for the idea that there can be intrapersonal impediments to the actualization of creative potentials, that may be influenced by environments. Again, there are implications for measurement. Specifically, creative potential is something other than expressed behavior, the actualization of motivation, or the production of creatively successful products (Runco, 2007).

Taken together, the research reviewed in the preceding several paragraphs provides empirical and not just theoretical support for a gap between potential and behavior, as well as some possible intrapersonal and situational explanations for this gap. This makes careful thought about how to measure potential, in a way that does not solely include behavioral indicators, or even the frequency of trait-relevant behaviors, necessary. *Personality as typical behavior* (Cronbach, 1949) may not be adequate for identifying trait-based potential. Many measures that attempt to access some or multiple components of creativity have been behavior-based (Feldhusen & Goh, 1995), which does make sense - there is a certain amount of objectivity if querying behavior. However, this becomes a problem if the target is potential for behavior which may not have occurred yet, or which may not need to be expressed outwardly. Take the Runco Ideational Scale (RIBS; Runco, Plucker, & Lim, 2001), which measures creative potential in the form of ideational behavior, for example. A portion of the items query internal experiences, that

may not ever come to fruition in an overtly observable sense. One might have many thoughts about a topic (ideational fluency), but not express them.

Measure Development

With the aforementioned considerations in mind, a measure of trait-based creative potential was developed. Potential represents the range of propensity for creative thought or behavior, that is to some degree unexpressed and may be possible to cultivate (Runco, 2004, 2007). In regard to the CP-PC, creative potential is conceptualized as being comprised of traits that have been associated with any number of ways to think or behave creativity at any level of personal or social success, recognition, or meaningfulness, related to one or more of the following areas: traditional conceptualizations of traits, cognitive, social, affective processes or styles, or attitudes, interests, skills, abilities, or problem approaches. These may or may not be expressed in the form of actual creative behavior or may be expressed to varying degrees for any given individual. Because traits lower the threshold for associated behaviors to occur, there may be some or even much expression of potential for some individuals, but little expression of latent potential for others. From this conceptualization, a specific number of traits are not required to 'have' creative potential. The concept of equifinality, or the idea that there are multiple paths to a given outcome, applies. While possessing 'more' traits probably helps with creativity (as already discussed) and being high in one relevant trait may increase the likelihood of that being the case for those that are related (DeYoung, Graziopline, & Peterson, 2012), there are, as reviewed, different ways to have creative potential.

For reasons already noted, there was divergence from an attempt to measure the behavioral consistency component of personality in the design of the CP-PC. This approach also makes sense in light of more recent research that has indicated that traits do predict behavior

over time, but that behavioral expression of traits is also subject to significant within-person variability (Jayawickreme, Zachry, & Fleeson, 2019). There is indication that even personality traits have strong state-like components, and trait expression will fluctuate, in part, as a result of sensitivity to environmental demands, goals in a given context, and the extent to which a trait is cued by an environment (Fleeson, 2007; Tett & Burnett, 2003). The extent of this variability is correlated with self-rated functional flexibility, which reflects an individual's ability and desire to adapt their behavior to meet situation-specific requirements (Lievans et al., 2018), as well as with the extent to which individuals act in accordance with what they perceive to be their true selves (Sheldon, Ryan, Rawsthorne, & Illardi, 1997). If creative individuals are more flexible, as research would suggest, this in an important caveat to consider. For example, if a participant is asked to indicate whether or not he or she strongly agrees that he or she is independent, more room for error is provided if some respondents respond based on a maximum tendency toward independence and some respond based on an average of independence across situations. With this in mind, the instructions of the CP-PC direct participants to consider the extent to which each item reflects their truest selves, even if they do not always behave in a manner that is consistent with a CP-PC item. In theory, this should allow, for example, individuals who are in daily environments that discourage creativity-associated behaviors to experience less ambiguity about the response to choose. This covers the idea of traits functioning as "enduring dispositions" (Costa & McCrae, 1995, p. 127) without *requiring* behavioral consistency. Furthermore, because people may not realize that they are creative (Richards, 2007) and to prevent self-beliefs which may include implicit and inaccurate theories about what creativity is from influencing responses, only one item on the measure is very clearly face-valid for creativity (this item includes the descriptor *creative*). There is some past research that has indicated that

clearly face-valid measures of creative *ability*, at least, may be problematic (Reiter-Palmon et al., 2012).

An additional goal was to develop the measure in such a way as to not reinforce the arts-bias in perceptions of creativity and creative individuals (e.g., Patston, Cropley, Marrone, & Kaufman, 2018), or to only account for traits associated with being artistically creative. With this goal in mind, the CP-PC was designed to simultaneously be both as domain-general and domain-spanning as possible, with items focused on capacities that have been associated with varied types of creative expression, or likely indicate the potential to develop in any area where interest, skill, or ability are present (e.g., capacity for original thought). The items that target various aspects of ideation are a good example of this. A respondent may have many new ideas, but the CP-PC does not ask for clarification as to whether these new ideas are related to music, physics, sewing, chess, or mathematics. This is not to say that general traits always manifest across all domains of creative behavior within a given individual (a position criticized by Kaufman & Baer, 2004), but that they provide raw material that can be developed and are relevant to a number of domains, given skills, interests, opportunities, positive encounters with specific domains, etc. A potential weakness of openness measures or other trait-based creativity measures, for example, may be that they often include items that focus on such specifics, including asking if the respondent would like to visit an art gallery (Ashton & Lee, 2009), discuss philosophy (DeYoung, Quilty, & Peterson, 2007), or get a pilot's license (Davis, 1975). These items are quite clearly on the domain-specific side, and therefore run the risk of missing folks who have creative potential but who do not have an interest in the specific activity queried.

Constructs focused on negative emotion or affective instability were also avoided unless items could be framed in such a way as to imply sensitivity, but not what one does with it, how

well it is handled, or whether that sensitivity would only logically result in distress or instability. In addition to the domain differences already reviewed (e.g., different affective indicators of creative potential between artists and scientists), this was because Richards (1990), Runco (1994), and others have pointed out that although disequilibria can be good for creativity, too much dysregulation may impede it. For example, individuals who both struggle to a great extent with mental health and are creatively accomplished may constitute a special population (Akiskal et al., 1998; Acar, Chen, & Cayirdag, 2018). In fact, multiple Axis I disorders are characterized by either low motivation or other forms of behavioral inhibition and associated distress and impairment (American Psychiatric Association, 2013). In the realm of creativity research, this concern is valid, given a study conducted by Baas, Nijstad, Boot, & De Dreu (2016), which found that vulnerability to disorders characterized by higher approach motivation predicted creativity variables, but those characterized by avoidant-behavior or disengagement (e.g., anhedonia) did not. Additional work (Baas, Nijstad, Boot & De Dreu, 2019) found similar results, and also that the relationship between approach-oriented vulnerability to psychopathology and creativity could be explained by approach-sensitivity to novelty. Still, emotional and cognitive processes likely interact in creative endeavors (Selby, Shaw, & Houtz, 2005), so careful thought about the framing of items that might tap into affective components was important.

Relatedly, items that explicitly targeted persistence, confidence, ambition, energy, a desire for power, or similar such constructs were also largely avoided, though some variation (or variations) of such are regularly included in measures or conceptualizations of potential or personality (e.g., the Beyonder Checklist; Torrance, 2002). Difficulty in these areas could quite clearly be explanations for a lack of actualization of potential, and thus may confound attempts

to measure it. Stating that having a propensity for getting things done indicates the potential to do things, for example, is a tautology. Instead, any motivation-focused items reflect a general propensity for curiosity, passion, and interest, as these things enable creativity but are probably not as likely to be confounded with the extent to which creative potential has been actualized. Respondents are asked if they passionately engage with the things that interest them, but not if anything comes from that engagement, such as performing well at an activity of interest, or prolonged persistence. This concern seems validated by motivation-focused sub-traits loading onto different factors, showing discriminant relationships with outcomes, or appearing distinct from other sub-constructs in theoretical models (e.g., De Drue, Baas, & Nijstad, 2012; Helson, Roberts, & Agronick, 1995; Fürst, Ghisletta, & Lubart, 2016; Fürst & Lubart, 2017). Runco (2014; 2015a) has noted that persistence and productivity are not essential to creative behavior, though they may help with social recognition of that behavior. It is important to remember that creative behavior need not result in socially recognized products, but can instead involve new ideas and interpretations, which may not be expressed in a traditional sense, and may, in fact, only be personally meaningful to the individual who has developed them (Runco, 2015a; Runco & Pina, 2013).

Next was the goal of addressing possible issues that may result from some dichotomously or reverse-scored items on measures of creative personality or potential, especially in relation to complexity and paradoxical traits (e.g., Barron, 1957), of which I have already provided some discussion. Additionally, Csikszentmihalyi (1996) wrote:

> Are there no traits that distinguish creative people? If I had to express in one word what makes their personalities different from others, it would be *complexity*. By this I mean that they show tendencies of thought and action that in most people are segregated. They

> contain contradictory extremes. Instead of being an "individual," each of them is a "multitude."…These qualities are present in each of us, but usually we are trained to develop only one pole of the dialectic. (p. 57)

Like Barron's, his research found that creative individuals are characterized by a number of paradoxical traits: creative individuals are both energetic and need long periods of rest, smart and naive, playful and disciplined, imaginative and able to be realistic, needing of solitude and community, humble and proud, masculine and feminine, rebellious and conservative, and passionate and objective. Finally, because of their openness and sensitivity, they experience both a great deal of joy and a great deal of pain. Similarly, Fürst & Lubart (2017) reviewed a number of apparently paradoxical relationships between higher order personality factors and creative behavior, specifically. Paradoxical effects have appeared in relation to the higher order factor of stability, a lower order facet of neuroticism (withdrawal), conscientiousness, and a lower-order facet of extraversion (enthusiasm). If creative individuals are indeed complex in this way, obvious problems may arise from the inclusion of some reverse-scored items, as well as items that ask individuals to choose whether they have a particular trait, or not. In support of this position, more recent research in the field of clinical psychology has indicated that personality tends to exist on a continuum (i.e. it is more appropriately conceptualized as dimensional, as opposed to categorical: see Kotov et al., 2017). The dichotomous categorization issue in creativity research has been noted by Simonton (2017) though this was also related to binary mental health diagnoses. Still, he pointed out that humans are probably more complicated than being placed in binary categories, which is also an issue that has been noted in the broader psychometric literature, again, in the field of clinical psychology (Smith, McCarthy, & Zapolski, 2009).

Furthermore, in terms of the psychometrics properties of personality measures, scale validity tends to suffer when fewer than four response options are presented, and means for scales with two response options have been found to be significantly lower that scales that allow more variability (Simms, Zelazny, Williams, & Bernstein, 2019). Six response options were chosen for the CP-PC, as internal consistency reliability tends to increase up to this point (Simms et al., 2019). Scale mid-points (e.g., neutral, neither agree nor disagree) are not included for the CP-PC, as mixed-methods research has indicated that midpoint responses are less likely to reflect individual variation on a construct than they are to reflect that the target of the item varies across contexts (Kulas & Stachowski, 2013). Measure reliability is typically better for openness to experience items when an even as opposed to odd number of response options are provided (Simms et al., 2019). Because openness to experience is a strong correlate of creativity-specific variables, such considerations are relevant.

Finally, moving on to other practical considerations, many of the scales for measuring creative personality were either quite short or quite long. Shorter scales may decrease cognitive demand, but may also be more likely suffer from a restriction in variance in environments where individuals can reasonably expected to be high on the construct, which can decrease the precision of correlation coefficients (Meade, 2010). It is possible that this could be an issue, for example, if employees in unambiguously creative organizations are surveyed. Long scales may provide nuanced information and increased reliability but can be perceived as burdensome and result in poorer data quality and higher levels of attrition, especially if multiple measures are used within a given survey (Galesic & Bosnjak, 2009; Hugick & Best, 2008). As such, a goal with the CP-PC was to create a measure that fits somewhere in the middle of existing instruments in terms of item number.

Item Development

An extensive and broad literature review was conducted to aid in item development. Constructs that have been found to be part of creative personality or creativity-supportive cognitive processes, styles, skills, attitudes, resources, abilities, etc. were considered for inclusion. This is why the instrument is referred to as a composite measure of trait-based creative potential. The term 'trait-*based*' is used, because there may be some disagreement as to where some constructs fall on the state-trait continuum. Still, again, measure instructions and scale anchors are framed in such a way as to pull for trait and not state endorsements. This approach has been used with success with conceptualization and measurement of other constructs that can be either state or trait-based, such a flow and anxiety (Baumann, 2012; Castillo, Cooke, Macfarlane, & Aitken, 2016; Zuckerman, 2015). Creativity-related constructs were considered for inclusion in the CP-PC based on the consistency of presence and consistent findings in the research literature, whether they were also supported by recent research, whether constructs had the potential to contribute something new and useful to a measure of creative personality/potential, and the extent to which they aligned with the goals of measure development as reviewed in the previous sections. These goals included creating a measure able to capture potential in a variety of domains, that reflected the potential to behave creatively without overreliance on items that were likely tied to particular affective states or reflective of actual expressed behavior or success, that had items that could be framed in a way that was free of context, and that was not biased toward demographic variables, like being a particular age or sex. In addition to the research literature several personality, self-concept, cognitive, and attitudinal measures specific to creativity or its correlates (e.g. openness to experience) were also reviewed during the item development phase, many of which have already been mentioned. In

particular, the RIBS and SRCT were used to guide item development, with some items being used or adapted (again, with different instructions and scale anchors) from these with the permission of the first author, since these instruments have been found to be reliable and valid in past research and are directly relevant to measuring trait-based creative potential.

Examples of constructs and publications reviewed during the development of the CP-PC are presented in Table 2.1. Of course, many constructs have some overlap, both conceptually and in terms of where they are discussed in the literature. From this review, an item pool was developed and subsequently narrowed down based on discussions with individuals in the field of creativity research. A major goal in item construction and selection, given the desire to create a mid-range measure in terms of item number, was to cover as many relevant constructs as possible without having an overwhelming number of items, and to also cover both the cognitive and non-cognitive aspects of constructs when possible. Although not necessarily ideal, to keep the number of items low and coverage high, this was sometimes done within the same question. Item format is analogous to that of the SRCT; a descriptor is provided in bold text, with a brief explanation following. The initial items and modifications to items based on the pilot study are provided in Tables 2.2 and 2.3; additional items added to the measure based on the pilot and prior to Study Two are presented in Table 2.4.

References

Abraham, A. (2016). Gender and creativity: An overview of psychological and neuroscientific literature. *Brain Imaging and Behavior, 10,* 609-618. https://doi.org/10.1007/s11682-015-9410-8

Acar, S., Chen, X., & Cayirdag, N. (2018). Schizophrenia and creativity: A meta-analytic review. *Schizophrenia Research*, *195*, 23-31. https://doi.org/10.1016/j.schres.2017.08.036

Acar, S., & Runco, M. A. (2014). Assessing associative distance among ideas elicited by tests of divergent thinking. *Creativity Research Journal*, *26*, 229–238. https://doi.org/10.1080/10400419.2014.901095

Acar, S. & Runco, M. A. (2015). Thinking in multiple directions: Hyperspace categories in divergent thinking. *Psychology of Aesthetics, Creativity, and the Arts*, *9*, 41–53. https://doi.org/10.1037/a0038501

Akiskal, H. S., Placidi, G. F., Maremmani, I., Signoretta, S., Liguori, A., Gervasi, R.,...Puzantian,V.R. (1998). TEMPS-I: delineating the most discriminant traits of the cyclothymic, depressive, hyperthymic and irritable temperaments in a nonpatient population. *Journal of Affective. Disorders.* 51, 7–19. https://doi: 10.1016/s0165-0327(98)00152-9

Albert, R. S., & Runco, M. A. (1988). Independence and the creative potential of gifted and exceptionally gifted boys. *Journal of Youth and Adolescence*, *18*, 221-230. https://doi.org/10.1007/BF02139037

An, D., & Runco, M. A. (2016). General and domain-specific contributions to creative ideation and creative performance. *Europe's Journal of Psychology*, *12*(4), 523–532. https://doi:10.5964/ejop.v12i4.1132

An, D., Song, Y., & Carr, M. (2016). A comparison of two models of creativity: Divergent thinking and creative expert performance. *Personality and Individual Differences*, *90*(C), 78–84. https://doi.org/10.1016/j.paid.2015.10.040

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45*, 357–376. https://doi.org/10.1037/0022-3514.45.2.357

Amabile, T. M. (1997). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review*, *40*, 39–58. https://doi.org/10.2307/41165921

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Ashton, M. C., & Lee, K. (2009). The HEXACO-60: A short measure of the major dimensions of personality. *Journal of Personality Assessment, 91*, 340-345. https://doi.org/10.1080/00223890902935878

Averill, J. R. (1999). Individual differences in emotional creativity: Structure and correlates. *Journal of Personality, 67,* 331-371.

Averill, J. R. (2009). Emotional creativity: Toward "spiritualizing the passions" In S. J. Lopez & C. R. Snyder (Eds.), *Oxford library of psychology. Oxford handbook of positive psychology* (pp. 249-257). New York, NY, US: Oxford University Press.

Averill, J. R., Chon, K. K., & Hahn, D. W. (2001). Emotions and creativity, East and West. *Asian Journal of Social Psychology, 4,* 165-183. https://doi.org/10.1111/1467-839X.00084

Baas, M., Nijstad, B. A., Boot, N. C., & De Dreu, C. K. (2016). Mad genius revisited:

Vulnerability to psychopathology, biobehavioral approach-avoidance, and creativity. *Psychological Bulletin, 142*, 668. https://doi.org/10.1037/bul0000049

Baas, M., Nijstad, B. A., Koen, J., Boot, N. C., & De Dreu, C. K. W. (2019). Vulnerability to psychopathology and creativity: The role of approach-avoidance motivation and novelty seeking. *Psychology of Aesthetics, Creativity, and the Arts.* Advance online publication. https://doi.org/10.1037/aca0000223

Barbot, B., Hass, R. W., & Reiter-Palmon, R. (2019). Creativity assessment in psychological research: (Re)setting the standards. *Psychology of Aesthetics, Creativity, and the Arts, 13*, 233-240. https://doi.org/10.1037/aca0000233

Baron, R. (2006). Opportunity recognition as pattern recognition: How entrepreneurs "connect the dots" to identify new business opportunities. *Academy of Management Perspectives, 20*, 104-119. https://doi.org/10.5465/amp.2006.19873412

Barron, F. (1955). The disposition toward originality. *The Journal of Abnormal and Social Psychology*, *51*, 478–485. https://doi.org/10.1037/h0048073

Barron, F. (1957). Originality in Relation to Personality and Intellect. *Journal of Personality*, *25*, 730–743. https://doi.org/10.1111/1467-6494.ep8930936

Barron, F. (1963). *Creativity and psychological health.* Princeton, NJ: Van Nostrand.

Barron, F., & Harrington, D. M. (1981). Creativity, intelligence, and personality. *Annual Review of Psychology*, *32*, 439-476. doi:10.1146/annurev.ps.32.020181.002255

Basadur, M. (1995). Optimal ideation-evaluation ratios. *Creativity Research Journal*, *8*, 63–75. https://doi.org/10.1207/s15326934crj0801_5

Basadur, M., & Basadur, T. (2011). Where are the generators?. *Psychology of Aesthetics, Creativity, and the Arts*, *5*, 29-42. https://doi.org/10.1037/a0017757

Basadur, M., & Hausdorf, P. A. (1996). Measuring divergent thinking attitudes related to creative problem solving and innovation management. *Creativity Research Journal*, *9*, 21-32. https://doi.org/10.1207/s15326934crj0901_3

Basadur, M., Runco, M. A., & Vega, L. A. (2000). Understanding how creative thinking skills, attitudes and behaviors work together: A causal process model. *The Journal of Creative Behavior*, *34*, 77–100. https://doi.org/10.1002/j.2162-6057.2000.tb01203.x

Baumann, N. (2012). Autotelic personality. In S. Engeser (Ed.), *Advances in flow research* (pp. 165-186). New York, NY: Springer.

Beghetto, R. A. (2014). Creative mortification: An initial exploration. *Psychology of Aesthetics, Creativity, and the Arts, 8*, 266-276. http://dx.doi.org/10.1037/a0036618

Benedek, M., Könen, T., & Neubauer, A. C. (2012). Associative abilities underlying creativity. *Psychology of Aesthetics, Creativity, and the Arts, 6*, 273-281. https://doi.org/10.1037/a0027059

Brown, R. T. (1989). Creativity: What are we to measure? In J. A. Glover, R. R. Ronning, & C. R. Reynolds (Eds.), *Handbook of creativity* (pp. 3-32). New York: Plenum.

Butler, L. D. (2006). Normative dissociation. *Psychiatric Clinics*, *29*, 45-62. https://doi.org/10.1016/j.psc.2005.10.004

Campbell, D. T. (1960). Blind variation and selective retentions in creative thought as in other knowledge processes. *Psychological Review*, *67*(6), 380-400. https://doi.org/10.1037/h0040373

Carson, S. H., Peterson, J. B., & Higgins, D. M. (2003). Decreased latent inhibition is associated

with increased creative achievement in high-functioning individuals. *Journal of Personality and Social Psychology*, *85*(3), 499-506. https://doi.org/10.1037/0022-3514.85.3.499

Castillo, M. I., Cooke, M. L., Macfarlane, B., & Aitken, L. M. (2016). Trait anxiety but not state anxiety during critical illness was associated with anxiety and depression over 6 months after ICU. *Critical Care Medicine*, *44*(1), 100-110. https://doi.org/10.1097/CCM.0000000000001356.

Cattani, G. & Ferriani S. (2008). A core/periphery perspective on individual creative performance: Social networks and cinematic achievements in the Hollywood film industry. *Organizational Science*, 19,824-844. https://doi.org/10.1287/orsc.1070.0350

Charlton, S., & Bakan, P. (1989). Cognitive complexity and creativity. *Imagination, Cognition and Personality*, *8*, 315–322. https://doi.org/10.2190/C21K-GM0L-AV83-3P4H

Cohen, L. M. (2012). Adaptation and creativity in cultural context. *Revista de Psicología*, *30*(1), 3–18.

Cohen, L. M. & Ambrose, D. A. (1999). Adaptation and creativity. In R. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity* (Vol. 1, pp. 9-22). San Diego, CA: Academic Press.

Collins, M. A., & Amabile, T. M. (1999). Motivation and Creativity. In R. J. Sternberg (Ed.), *Handbook of Creativity* (pp. 297–312). Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511807916.017

Costa Jr, P. T., McCrae, R. R., & Kay, G. G. (1995). Persons, places, and personality: Career assessment using the Revised NEO Personality Inventory. *Journal of Career Assessment*, *3*, 123-139. https://doi.org/10.1177/106907279500300202

Cramond, B., Matthews-Morgan, J., Bandalos, D., & Zuo, L. (2005). A report on the 40-Year

follow-up of the Torrance Tests of Creative Thinking: Alive and well in the new millennium. *Gifted Child Quarterly*, *49*, 283–291. https://doi.org/10.1177/001698620504900402

Cronbach, L. J. (1949). *Essentials of psychological testing*. New York: Harper and Row.

Csikszentmihalyi, M. (1996). *Creativity: The psychology of discovery and invention*. New York, NY, US: HarperCollins Publishers.

Cropley, A. J. (1999). Creativity and cognition: Producing effective novelty. *Roeper Review*, *21*, 253-260. https://doi.org/10.1080/02783199909553972

Cropley, A. (2006). In Praise of Convergent Thinking. *Creativity Research Journal*, *18*, 391–404. https://doi.org/10.1207/s15326934crj1803_13

Csikszentmihalyi, M. (1988). Society, culture, and person: A systems view of creativity. In R. J. Sternberg (Ed.), *The nature of creativity: Contemporary psychological perspectives* (pp. 325-339). New York, NY, US: Cambridge University Press.

Csikszentmihalyi, M., & Getzels, J. W. (1971). Discovery-oriented behavior and the originality of creative products: A study with artists. *Journal of Personality and Social Psychology, 19*, 47-52. https://doi.org/10.1037/h0031106

Csikszentmihalyi, M., & Getzels, J. W. (1973). The personality of young artists: An empirical and theoretical exploration. *British Journal of Psychology*, *64*, 91-104. https://doi.org/10.1111/j.2044-8295.1973.tb01331.x

Csikszentmihalyi, M., & Getzels, J. W. (1988). Creativity and problem finding in art. In F. H. Farley & R. W. Neperud (Eds.), *The foundations of aesthetics, art, & art education* (pp. 91-116). New York, NY, England: Praeger Publishers.

Da Costa, S., Páez, D., Sánchez, F., Garaigordobil, M., & Gondim, S. (2015). Personal factors of

creativity: A second order meta-analysis. *Revista de Psicología del Trabajo y de las Organizaciones*, *31*, 165-173. https://doi.org/10.1016/j.rpto.2015.06.002

Dawson, V. L., D'Andrea, T., Affinito, R., & Westby, E. L. (1999). Predicting creative behavior: A reexamination of the divergence between traditional and teacher-defined concepts of creativity. *Creativity Research Journal*, *12*, 57-66. https://doi.org/10.1207/s15326934crj1201_7

Davis, G. A. (1975). In frumious pursuit of the creative person. *The Journal of Creative Behavior*, *9*, 75-87. https://doi.org/10.1002/j.2162-6057.1975.tb00561.x

Davis, G. A. (1999). Barriers to creativity and creative attitudes. In M.A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity*, pp. 165-174. San Diego, CA: Academic Press.

Davis, S. N., Keegan, R. T., & Gruber, H. E. (2012). Creativity as purposeful work: The evolving systems approach. In M.A. Runco (Ed.), *Creativity research handbook* (Vol. 2, pp. 199-232. Cresskill, NJ: Hampton Press.

Davis, G. A., & Subkoviak, M. J. (1975). Multidimensional analysis of a personality-based test of creative potential. *Journal of Educational Measurement*, *12*, 37-43. https://doi.org/10.1111/j.1745-3984.1975.tb01007.x

DeYoung, C. G., Grazioplene, R. G., & Peterson, J. B. (2012). From madness to genius : The Openness / Intellect trait domain as a paradoxical simplex. *Journal of Research in Personality*, *46*, 63–78. https://doi.org/10.1016/j.jrp.2011.12.003

DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology*, *93*(5), 880–96. https://doi.org/10.1037/0022–3514.93.5.880

De Bono, E. (1969). Information Processing and New Ideas — Lateral and Vertical Thinking.

The Journal of Creative Behavior, *3*(3), 159–171. https://doi.org/10.1002/j.2162-6057.1969.tb00124.x

De Dreu, C. K. W., Baas, M., & Nijstad, B. A. (2012). The emotive roots of creativity: Basic and applied issues on affect and motivation. In M. D. Mumford (Ed.), *Handbook of organizational creativity* (pp. 217–240). Amsterdam: Academic Press. https://doi.org/https://doi.org/10.1016/B978-0-12-374714-3.00010-0

Domino, G. (1994). Assessment of creativity with the ACL: An empirical comparison of four scales. *Creativity Research Journal*, *7*, 21–33. https://doi.org/10.1080/10400419409534506

Drevdahl, J. E., & Cattell, R. B. (1958). Personality and creativity in artists and writers. *Journal of Clinical Psychology, 14*, 107-111. https://doi.org/10.1002/1097-4679(195804)14:2<107::AID-JCLP2270140202>3.0.CO;2-T

Ekvall, G. (1997). Organizational conditions and levels of creativity. *Creativity and Innovation Management*, *6*, 195–205. https://doi.org/doi:10.1111/1467-8691.00070

Epstein, R., Schmidt, S. M., & Warfel, R. (2008). Measuring and training creativity competencies: Validation of a new test. *Creativity Research Journal, 20*, 7-12. https://doi.org/10.1080/10400410701839876

Eysenck, H. J. (1993). Creativity and personality: Suggestions for a theory. *Psychological Inquiry*, *4*, 147-178. https://doi.org/10.1207/s15327965pli0403_1

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, *2*, 290-309. https://doi.org/10.1207/s15327957pspr0204_5

Feist, G. J. (1999a). The influence of personality on artistic and scientific creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 273-296). New York, NY, US: Cambridge University Press.

Feist, G.J. (1999b), Autonomy and independence. In M.A. Runco & S. Pritzker (Eds.), *Encyclopedia of Creativity* (pp.157-163). San Diego, CA: Academic Press.

Feist, G. J. (2010). The function of personality in creativity: The nature and nurture of the creative personality. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 113-130). New York, NY, US: Cambridge University Press. https://doi.org/10.1017/CBO9780511763205.009

Feldhusen, J., & Goh, B. (1995). Assessing and accessing creativity: An integrative review of theory, research, and development. *Creativity Research Journal*, *8*, 231–247. https://doi.org/10.1207/s15326934crj0803

Finke, R. A., Ward, T. B., & Smith, S. M. (1992). Creative cognition: Theory, research and applications. Cambridge, MA: MIT Press.

Fleeson, W. (2007). Situation-based contingencies underlying trait-content manifestation in behavior. *Journal of Personality*, *75*, 825–862. https://doi.org/10.1111/j.1467-6494.2007.00458.x

Foss, L., Woll, K., & Moilanen, M. (2013). Creativity and implementations of new ideas: do organisational structure, work environment and gender matter?. *International Journal of Gender and Entrepreneurship*, *5*, 298-322.

Furnham, A. (2017). Personality Traits, Personality Disorders, and Creativity. In G. Feist, R. Reiter-Palmon, & J. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (Cambridge Handbooks in Psychology, pp. 251-272). Cambridge:

Cambridge University Press. doi:10.1017/9781316228036.014

Fürst, G., Ghisletta, P., & Lubart, T. (2016). Toward an integrative model of creativity and personality: Theoretical suggestions and preliminary empirical testing. *The Journal of Creative Behavior, 50*, 87–108. https://doi.org/10.1002/jocb.71

Fürst, G., & Lubart, T. (2017). An integrative approach to the creative personality: Beyond the big five paradigm. In G. J. Feist, R. Reiter-Palmon, & J. C. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (pp. 140-164). New York, NY, US: Cambridge University Press. https://doi.org/10.1017/9781316228036.009

Galesic, M., & Bosnjak, M. (2009). Effects of questionnaire length on participation and indicators of response quality in a web survey. *Public Opinion Quarterly, 73*, 349–360. https://doi.org/10.1093/poq/nfp031

Gardner, H. (1994). The creators' patterns. In M. A. Boden (Ed.), *Dimensions of creativity* (pp. 143-158). Cambridge, MA, US: The MIT Press.

Gardner, H., & Wolf, C. (1994). The fruits of asynchrony: A psychological examination of creativity. In D. H. Feldman, M. Csikszentmihalyi, & H. Gardner (Eds.), *Changing the world: A framework for the study of creativity* (pp. 47–68).Westport, CT: Praeger.

Getzels, J. W., & Jackson, P. W. (1962). *Creativity and intelligence: Explorations with gifted students*. Oxford: Wiley.

Gilson, L. L., & Madjar, N. (2011). Radical and incremental creativity: Antecedents and processes. *Psychology of Aesthetics, Creativity, and the Arts*, *5*, 21-28. https://doi.org/10.1037/a0017863

Gordon, W. J. J. (1961). Synectics: The development of creative capacity. Oxford, England: Harper.

Gough, H. G. (1976). Studying creativity by means of word association tests. *Journal of Applied Psychology, 61,* 348-353. https://doi.org/10.1037/0021-9010.61.3.348

Gough, H. G. (1979). A Creative Personality Scale for the Adjective Check List. *Journal of Personality and Social Psychology, 37,* 1398–1405. https://doi.org/10.1037/0022-3514.37.8.1398

Gough, H. G., & Heilbrun, A. B. (1965). Manual for the adjective check list. Palo Alto, CA: Consulting Psychologists Press.

Grand, I. J. (2016). Wonder woman and the polycultural contexts of everyday creativity. In V. P. Glăveanu, V. P. Glăveanu (Eds.), *The Palgrave handbook of creativity and culture research* (pp. 595-620). New York, NY: Palgrave Macmillan.

Gruber, H. E. (1981). On the relation between AHA experiences and the construction of ideas. *History of Science, 19,* 41–59. https://doi.org/10.1177/007327538101900104

Gruber, H. E. (1988). The evolving systems approach to creative work. *Creativity Research Journal, 1,* 27–51. https://doi.org/10.1080/10400418809534285

Guastello, S. J. (1998). Creative problem solving groups at the edge of chaos. *The Journal of Creative Behavior, 32,* 38-57. https://doi.org/http://dx.doi.org/10.1002/j.2162-6057.1998.tb00805.x

Guastello, S. J., Guastello, D. D., & Hanson, C. A. (2004). Creativity, mood disorders, and emotional intelligence. *The Journal of Creative Behavior, 38,* 260-281. https://doi.org/10.1002/j.2162-6057.2004.tb01244.x

Guilford, J. P. (1950). Creativity. *American Psychologist, 5,* 444-454. https://doi.org/10.1037/h0063487

Guilford, J. P. (1956). The structure of intellect. *Psychological Bulletin, 53,* 267-293.

https://doi.org/10.1037/h0040755

Guilford, J. P. (1973). Characteristics of creativity. Retrieved from https://eric.ed.gov/?id=ED080171

Gutbezahl, J., & Averill, J.R. (1996) Individual differences in emotional creativity as manifested in words and Pictures, *Creativity Research Journal*, *9* 327-337, https://doi.org/10.1207/s15326934crj0904_4

Harrington, D. M., & Anderson, S. M. (1981). Creativity, masculinity, femininity, and three models of psychological androgyny. *Journal of Personality and Social Psychology, 41*(4), 744-757.http://dx.doi.org/10.1037/0022-3514.41.4.744

Harrington, D. M., Block, J., & Block, J. H. (1983). Predicting creativity in preadolescence from divergent thinking in early childhood. *Journal of Personality and Social Psychology, 45*, 609-623. https://doi.org/10.1037/0022-3514.45.3.609

Helson, R. (1996). In Search of the Creative Personality. *Creativity Research Journal*, *9*, 295–306. https://doi.org/10.1207/s15326934crj0904_1

Helson, R. (1971). Women mathematicians and the creative personality. *Journal of Consulting and Clinical Psychology*, *36*, 210-220. https://doi.org/10.1037/h0030728

Helson, R. (1999). A Longitudinal Study of Creative Personality in Women. *Creativity Research Journal*, *12*, 89–101. https://doi.org/10.1207/s15326934crj1202_2

Helson, R., Roberts, B., & Agronick, G. (1995). Enduringness and change in creative personality and the prediction of occupational creativity. *Journal of Personality and Social Psychology*, *69*, 1173–1183. https://doi-org/10.1037/0022-3514.69.6.1173

Helson, R., & Srivastava, S. (2002). Creative and wise people: Similarities, differences, and how

they develop. *Personality and Social Psychology Bulletin*, *28*, 1430-1440. https://doi.org/10.1177/014616702236874

Herbert, R. (2013). An empirical study of normative dissociation in musical and non-musical everyday life experiences. *Psychology of Music*, *41*, 372-394. https://doi.org/10.1177/0305735611430080

Hocevar, D. (1979). Ideational fluency as a confounding factor in the measurement of originality. *Journal of Educational Psychology, 71,* 191-196. https://doi.org/10.1037/0022-0663.71.2.191

Hocevar, D. (1981). Measurement of creativity: Review and critique. *Journal of Personality Assessment, 45,* 450–464. https://doi-org/10.1207/s15327752jpa4505_1

Hugick, L. & Best, J. (2008). Questionnaire length. In P. J. Lavrakas (Ed.), *Encyclopedia of survey research methods* (pp. 660-660). Thousand Oaks, CA: Sage Publications, Inc. https://doi.org/10.4135/9781412963947.n426

Hunter, J. A., Abraham, E. H., Hunter, A. G., Goldberg, L. C., & Eastwood, J. D. (2016). Personality and boredom proneness in the prediction of creativity and curiosity. *Thinking Skills and Creativity, 22,* 48-57. https://doi.org/10.1016/j.tsc.2016.08.002

Ivcevic, Z., & Mayer, J. D. (2009). Mapping dimensions of creativity in the life-space. *Creativity Research Journal*, *21*, 152-165. https://doi.org/10.1080/10400410902855259

Jay, E., & Perkins, D. (1997). Creativity's compass: A review of problem finding. In M. A. Runco (Ed.), *Creativity* resear*ch handbook (Vol. 1, pp. 257-293).* Cresskill, NJ: Hampton Press.

Jayawickreme, E., Zachry, C. E., & Fleeson, W. (2019). Whole Trait Theory: An integrative

approach to examining personality structure and process. *Personality and Individual Differences*, *136*, 2–11. https://doi.org/https://doi.org/10.1016/j.paid.2018.06.045

Joy, S. (2017). Innovation Motivation. In G. Feist, R. Reiter-Palmon, & J. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (Cambridge Handbooks in Psychology, pp. 214-234). Cambridge: Cambridge University Press. https://doi.org/10.1017/9781316228036.012

Judge, T. A., & Zapata, C. P. (2015). The person–situation debate revisited: Effect of situation strength and trait activation on the validity of the big five personality traits in predicting job performance. *Academy of Management Journal*, *58*, 1149–1179. https://doi.org/10.5465/amj.2010.0837

Kandler, C., Riemann, R., Angleitner, A., Spinath, F. M., Borkenau, P., & Penke, L. (2016). The nature of creativity: The roles of genetic factors, personality traits, cognitive abilities, and environmental sources. *Journal of Personality and Social Psychology*, *111*, 230–249. https://doi.org/10.1037/pspp0000087

Kashdan, T. B., Stiksma, M. C., Disabato, D. J., McKnight, P. E., Bekier, J., Kaji, J., & Lazarus, R. (2018). The five-dimensional curiosity scale: Capturing the bandwidth of curiosity and identifying four unique subgroups of curious people. *Journal of Research in Personality*, *73*, 130-149. https//doi.org/10.1016/j.jrp.2017.11.011

Karwowski, M. (2012). Did curiosity kill the cat? Relationship between trait curiosity, creative self-efficacy and creative personal identity. *Europe's Journal of Psychology*, *8*, 547-558. https://doi.org/https://doi.org/10.5964/ejop.v8i4.513

Karwowski, M., & Beghetto, R. A. (2018). Creative behavior as agentic action. *Psychology of*

Aesthetics, Creativity, and the Arts. Advance online publication. https://doi.org/10.1037/aca0000190

Karwowski, M., & Lebuda, I. (2016). The big five, the huge two, and creative self-beliefs: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts, 10*, 214-232. https://doi.org/10.1037/aca0000035

Karwowski, M., Lebuda, I., & Wiśniewska, E. (2018). Measuring creative self-efficacy and creative personal identity. *International Journal of Creativity & Problem Solving, 28,* 45-58.

Kaufman, J. C. (2019). Self-assessments of creativity: Not ideal, but better than you think. *Psychology of Aesthetics, Creativity, and the Arts, 13*(2), 187-192. http://dx.doi.org/10.1037/aca0000217

Kaufman, J. C., & Baer, J. (2004). Hawking's haiku, Madonna's math: Why it is hard to be creative in every room of the house. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 3-19). Washington, DC, US: American Psychological Association. http://dx.doi.org/10.1037/10692-001

Kerr, B., & McKay, R. (2013). Searching for tomorrow's innovators: Profiling creative adolescents. *Creativity Research Journal, 25*, 21-32.

Kerr B.K., & Vuyk M.A. (2013) Career development for creatively gifted students. In K.H. Kim, J.C. Kaufman, J. Baer, & B. Sriraman B. (Eds.), *Creatively gifted Students are not like other gifted students* (Advances in Creativity and Giftedness, Vol. 5, pp. 137-151). Sense Publishers, Rotterdam.

Khalil, R., Godde, B., & Karim, A. A. (2019). The link between creativity, cognition, emotion

and underlying neural mechanisms. *Frontiers in Neural Circuits, 13*, 18. https://doi.org/10.3389/fncir.2019.00018

Kirton, M. (1976). Adaptors and innovators: A description and measure. *Journal of Applied Psychology*, 61(5), 622. https://doi.org/10.1037/0021-9010.61.5.622

Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., ... & Eaton, N. R. (2017). The Hierarchical Taxonomy of Psychopathology (HiTOP): a dimensional alternative to traditional nosologies. *Journal of Abnormal Psychology, 126*, 454. https://doi.org/10.1037/abn0000258

Kulas, J. T., & Stachowski, A. A. (2013). Respondent rationale for neither agreeing nor disagreeing: Person and item contributors to middle category endorsement intent on Likert personality indicators. *Journal of Research in Personality, 47*, 254–262. https://doi.org/https://doi.org/10.1016/j.jrp.2013.01.014

Lebuda, I., & Karwowski, M. (2013). Tell me your name and I'll tell you how creative your work is: Author's name and gender as factors influencing assessment of products' creativity in four different domains. *Creativity Research Journal, 25*, 137–142. https://doi.org/10.1080/10400419.2013.752297

Li, W., Li, X., Huang, L., Kong, X., Yang, W., Wei, D., … Liu, J. (2015). Brain structure links trait creativity to openness to experience. *Social Cognitive and Affective Neuroscience, 10*, 191–198. https://doi.org/10.1093/scan/nsu041

Lievens, F., Lang, J. W. B., De Fruyt, F., Corstjens, J., Van de Vijver, M., & Bledow, R. (2018). The predictive power of people's intraindividual variability across situations: Implementing whole trait theory in assessment. *Journal of Applied Psychology, 103*, 753–771. https://doi.org/10.1037/apl0000280

Lubart, T. I., Zenasni, F., & Barbot, B. (2013). Creative potential and its measurement. *International Journal of Talent Development and Creativity*, *1*, 41-51.

Luescher, R., Barthelmess, P. Y., Kim, S., Richter, U. H., & Mittag, M. (2019). Conceptualizing creativity: General and cultural biases in Gough's Creative Personality Scale. *The Journal of Creative Behavior*, *53*, 30–43. https://doi.org/10.1002/jocb.160

MacKinnon, D. W. (1962). The nature and nurture of creative talent. *American psychologist*, *17*, 484. https://doi.org/10.1037/h0046541

Mackinnon, D. W. (1965). Personality and the realization of creative potential. *American Psychologist*, *20*, 273. https://doi.org/10.1037/h0022403

Madrid, H. P., & Patterson, M. G. (2016). Creativity at work as a joint function between openness to experience, need for cognition and organizational fairness. *Learning and Individual Differences*, *51*, 409–416. https://doi.org/10.1016/j.lindif.2015.07.010

Madjar, N., Greenberg, E., & Chen, Z. (2011). Factors for radical creativity, incremental creativity, and routine, noncreative performance. *Journal of Applied Psychology*, *96*(4), 730-743. https://doi.org/10.1037/a0022416

Martindale, C. (1977). Creativity, consciousness, and cortical arousal. *Journal of Altered States of Consciousness*, *3*, 69-87.

Martindale, C. (1999). Biological bases of creativity. In R. Sternberg, (Ed.), *Handbook of Creativity* (pp. 137-152). Cambridge: University Press.

Martindale, C. (2007). Creativity, primordial cognition, and personality. *Personality and Individual Differences*, *43*, 1777-1785. https://doi.org/10.1016/j.paid.2007.05.014

Martinsen, Ø. L. (1993). Insight problems revisited: The influence of cognitive styles and

experience on creative problem solving. *Creativity Research Journal*, *6*, 435–447. https://doi.org/10.1080/10400419309534498

Martinsen, Ø. L. (2011). The creative personality: A synthesis and development of the creative person profile. *Creativity Research Journal, 23*, 185-202. https://10.1080/10400419.2011.595656

Martinsen, Ø. L., Arnulf, J. K., Furnham, A., & Lang-Ree, O. C. (2019). Narcissism and creativity. *Personality and Individual Differences, 142*, 166-171. https://doi.org/10.1016/j.paid.2018.09.032

Maslow, A. H. (1962). Creativity in self-actualizing people. In A. Maslow, *Toward a psychology of being* (pp. 127-137). Princeton, NJ, US: D Van Nostrand. https://doi.org/10.1037/10793-010

Maxwell, S. E., Lau, M. Y., & Howard, G. S. (2015). Is psychology suffering from a replication crisis? What does "failure to replicate" really mean?. *American Psychologist, 70*, 487-498. https://doi.org/10.1037/a0039400.

McCain, J., Gentile, B., & Campbell, W. K. (2015). A psychological exploration of engagement in geek culture. *PloS one, 10*(11), e0142200. https://doi.org/10.1371/journal.pone.0142200.

McCall, M. W. (2010). Recasting leadership development. *Industrial and Organizational Psychology: Perspectives on Science and Practice*, *3*, 3–19. https://doi.org/10.1111/j.1754-9434.2009.01189.x

McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of Personality and Social Psychology, 52*, 1258–1265. https://doi.org/10.1037/0022-3514.52.6.1258

McMillan, R., Kaufman, S. B., & Singer, J. L. (2013). Ode to positive constructive daydreaming. *Frontiers in Psychology*, *4*, 626. https://doi.org/10.3389/fpsyg.2013.00626

Meade, A. (2010). Restriction of range. In N. J. Salkind (Ed.), *Encyclopedia of research design* (pp. 1279-1280). Thousand Oaks, CA: SAGE Publications, Inc. https://doi.org/10.4135/9781412961288.n388

Mednick, S.A. (1962). The associative basis of the creative process. *Psychological Review, 69*, 220-232. https://doi.org/10.1037/h0048850

Mellou, E. (1995). Creativity: The imagination condition. *Early Child Development and Care*, *114*, 97-106. https://doi.org/10.1080/0300443951140108

Meneely, J., & Portillo, M. (2005). The adaptable mind in design: Relating personality, cognitive style, and creative performance. *Creativity Research Journal, 17*, 155-166. https://doi.org/10.1080/10400419.2005.9651476

Mockros, C. A., & Csikszentmihalyi, M. (2014). The social construction of creative lives. In M. Csikszentmihalyi (Ed.), *The systems model of creativity: The collected works of Mihaly Csikszentmihalyi* (pp. 127–160). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-017-9085-7_9

Mumford, M. D., Baughman, W. A., Maher, M. A., Costanza, D. P., & Supinski, E. P. (1997). Process-based measures of creative problem-solving skills: IV. Category combination. *Creativity Research Journal, 10*, 59–71. https://doi.org/10.1207/s15326934crj1001_7

Mumford, M. D., Costanza, D. P., Threlfall, K. V., Baughman, W. A., & Reiter-Palmon, R. (1993). Personality variables and problem-construction activities: An exploratory investigation. *Creativity Research Journal, 6*, 365–389. https://doi.org/10.1080/10400419309534493

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin, 103*, 27. https://.doi.org/10.1037/0033-2909.103.1.27

Mumford, M. D., Hunter, S. T., & Byrne, C. L. (2009). What is the fundamental? The role of cognition in creativity and innovation. *Industrial and Organizational Psychology, 2*, 353–356. https://doi.org/10.1111/j.1754-9434.2009.01158.x

Mumford, M. D., Mobley, M. I., Reiter-Palmon, R., Uhlman, C. E., & Doares, L. M. (1991). Process analytic models of creative capacities. *Creativity Research Journal, 4*, 91–122. https://doi.org/10.1080/10400419109534380

Mumford, M. D., & Whetzel, D. L. (1996). Insight, creativity, and cognition: On Sternberg and Davidson's The Nature of Insight. *Creativity Research Journal, 9*, 103–107. https://doi.org/10.1207/s15326934crj0901_10

Norlander, T., Erixon, A., & Archer, T. (2000). Psychological androgyny and creativity: Dynamics of gender-role and personality trait. *Social Behavior and Personality, 28*, 423–436. https://doi.org/10.2444/sbp.2000.28.5.423

Patston, T. J., Cropley, D. H., Marrone, R. L., & Kaufman, J. C. (2018). Teacher implicit beliefs of creativity: Is there an arts bias?. *Teaching and Teacher Education, 75*, 366-374. https://doi.org/10.1016/j.tate.2018.08.001

Perkins, D. N. (1983), Novel remote analogies seldom contribute to discovery. *The Journal of Creative Behavior, 17*, 223-239. https://doi.org/10.1002/j.2162-6057.1983.tb00358.x

Proudfoot, D., Kay, A. C., & Koval, C. Z. (2015). A gender bias in the attribution of creativity: Archival and experimental evidence for the perceived association between masculinity and creative thinking. *Psychological Science, 26*, 1751-1761. https://doi.org/10.1177/0956797615598739

Puryear, J. S., Kettler, T., & Rinn, A. N. (2017). Relationships of personality to differential conceptions of creativity: A systematic review. *Psychology of Aesthetics, Creativity, and the Arts*, *11*, 59–68. https://doi.org/10.1037/aca0000079

Reiter-Palmon, R., Robinson-Morral, E. J., Kaufman, J. C., & Santo, J. B. (2012). Evaluation of self-perceptions of creativity: Is it a useful criterion? *Creativity Research Journal*, *24*, 107–114. https://doi.org/10.1080/10400419.2012.676980

Rhodes, M. (1961). An analysis of creativity, *Phi Delta Kappan, 42*, 305-310.

Richards, R. (1990). Everyday creativity, eminent creativity, and health: "Afterview" for CRJ issues on creativity and health. *Creativity Research Journal*, *3*, 300–326. https://doi.org/10.1080/10400419009534363

Richards, R. (2007). Everyday creativity: Our hidden potential. *Everyday Creativity and New Views of Human Nature: Psychological, Social, and Spiritual Perspectives.*, 25–54. https://doi.org/10.1037/11595-001

Rietzschel, E. F., Nijstad, B. A., & Stroebe, W. (2007). Relative accessibility of domain knowledge and creativity: The effects of knowledge activation on the quantity and originality of generated ideas. *Journal of Experimental Social Psychology*, *43*, 933-946. https://doi.org/10.1016/j.jesp.2006.10.014

Ritter, S. M., Damian, R. I., Simonton, D. K., van Baaren, R. B., Strick, M., Derks, J., & Dijksterhuis, A. (2012). Diversifying experiences enhance cognitive flexibility. *Journal of Experimental Social Psychology*, *48*(4), 961-964. https://doi.org/10.1016/j.jesp.2012.02.009

Rothenberg, A. (1971). The Process of Janusian Thinking in Creativity. *JAMA Psychiatry*, *24*, 195–205. https://doi.org/10.1001/archpsyc.1971.01750090001001

Root-Bernstein, R. S. (1988). Setting the stage for discovery. *The Sciences*, *28*(3), 26-34. https://doi.org/10.1002/j.2326-1951.1988.tb03019.x

Root-Bernstein, R. & Root-Bernstein M. (1999). *Sparks of genius: The 13 thinking tools of the world's most creative people*. New York: Houghton Mifflin.

Root-Bernstein, R., & Root-Bernstein, M. (2004). Artistic scientists and scientific artists: The link between polymathy and creativity. In R. J. Sternberg, E. Grigorenko, & J. Singer (Eds.). *Creativity: From potential to realization* (pp. 127-151). Washington, DC: American Psychological Association.

Root-Bernstein , M., & Root-Bernstein , R. (2006). Imaginary worldplay in childhood and maturity and its impact on adult creativity. *Creativity Research Journal, 18*, 405–425. https://doi.org/10.1207/s15326934crj1804_1

Roseman, M. F. (1988). Serendipity and Scientific Discovery. *The Journal of Creative Behavior*, *22*, 132–138. https://doi.org/doi:10.1002/j.2162-6057.1988.tb00674.x

Runco, M. A. (1994). Creativity and its discontents. In M. P. Shaw & M. A. Runco (Eds.), *Creativity and Affect* (pp. 53-65). Norwood, NJ: Ablex.

Runco, M. A. (1999). Tension, adaptability, and creativity. In S.W. Russ (Ed.), *Affect, creative experience, and psychological adjustment*, (pp.165-194). Philedelphia, PA: Brunner/Mazel.

Runco, M. A. (2004). Everyone has creative potential. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 21–30). Washington, DC: American Psychological Association. https://doi.org/10.1037/10692-002

Runco, M. A. (2007). A hierarchical framework for the study of creativity. *New Horizons in Education*, *55*(3), 1–9.

Runco, M. A. (2008). Creativity and education. *New Horizons in Education, 56*, 107-115.

Runco, M. A. (2014). "Big C, Little c" creativity as a false dichotomy: Reality is not categorical. *Creativity Research Journal*, *26*, 131–132. https://doi.org/10.1080/10400419.2014.873676

Runco, M. A. (2015a). A commentary on the social perspective on creativity. *Creativity. Theories – Research - Applications*, *2*, 21–31. https://doi.org/10.1515/ctra-2015-0003

Runco, M. A. (2015b). Meta-creativity: being creative about creativity. *Creativity Research Journal*, *27*, 295-298. https://doi.org/10.1080/10400419.2015.1065134

Runco, M. A. (2016). Commentary: Overview of developmental perspectives on creativity and the realization of potential. *New Directions for Child & Adolescent Development*, *2016*(151), 97–109. https://doi-org.ccl.idm.oclc.org/10.1002/cad.20145

Runco, M. A., Acar, S., & Cayirdag, N. (2017). A closer look at the creativity gap and why students are less creative at school than outside of school. *Thinking Skills and Creativity*, *24*, 242-249. https://doi.org/10.1016/j.tsc.2017.04.003

Runco, M. A., & Albert, R. S. (1985). The reliability and validity of ideational originality in the divergent thinking of academically gifted and nongifted children. *Educational and Psychological Measurement, 45*, 483–501. https://doi.org/10.1177/001316448504500306

Runco, M. A., & Bahleda, M. D. (1986). Implicit theories of artistic, scientific, and everyday creativity. *The Journal of Creative Behavior, 20*, 93-98. https://doi.org/10.1002/j.2162-6057.1986.tb00423.x

Runco, M. A., Campbell, W. K., Jaeger, G., McCain, J., & Gentile, B. (2016). Comparisons of

the creative class and regional creativity with perceptions of community support and community barriers. *Business Creativity and the Creative Economy*, *2*, 24–32. https://doi.org/10.18536/bcce.2016.06.2.1.04

Runco, M. A., & Cayirdag, N. (2012). The theory of personal creativity and implications for the fulfillment of children's potentials. In O. N. Saracho (Ed.), *Contemporary perspectives on research in creativity in early childhood education* (pp. 31-43). Charlotte, NC: IAP Information Age Publishing.

Runco, M. A., & Chand, I. (1995). Cognition and creativity. *Educational psychology review*, *7*, 243-267. https://doi.org/10.1007/BF02213373

Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal*, *24*, 92-96. doi:10.1080/10400419.2012.650092

Runco, M. A., Millar, G., Acar, S., & Cramond, B. (2010). Torrance tests of creative thinking as predictors of personal and public achievement: A fifty-year follow-up. *Creativity Research Journal*, *22*, 361–368. https://doi.org/10.1080/10400419.2010.523393

Runco, M. A., Nemiro, J., & Walberg, H. J. (1998). Personal explicit theories of creativity. *The Journal of Creative Behavior*, *32*, 1-17. https://doi.org/10.1002/j.2162-6057.1998.tb00803.x

Runco, M. A., & Pina, J. (2013). Imagination and personal creativity. In M. Taylor, M. Taylor (Eds.), *The Oxford handbook of the development of imagination* (pp. 379-386). New York, NY, US: Oxford University Press.

Runco, M. A., Plucker, J. A., & Lim, W. (2001). Development and psychometric integrity of a measure of ideational behavior. *Creativity Research Journal*, *13*, 393-400. https://doi.org/10.1207/S15326934CRJ1334_16

Russ, S. W. (2016). Pretend play: Antecedent of adult creativity. *New directions for child and adolescent development, 2016*(151), 21-32. https://doi.org/10.1002/cad.20154

Russ, S. W., & Dillon, J. A. (2011). Changes in children's pretend play over two decades. *Creativity Research Journal, 23*, 330–338. https://doi.org/10.1080/10400419.2011.621824

Said-Metwaly, S., Van den Noortgate, W., & Kyndt, E. (2017). Approaches to measuring creativity: a systematic literature review. *Creativity. Theories–Research-Applications, 4*(2), 238-275. https://doi.org/10.1515/ctra-2017-0013

Sawyer, K. (1992). Improvisational Creativity: An Analysis of Jazz Performance. *Creativity Research Journal, 5*, 253–263. https://doi.org/10.1080/10400419209534439

Sawyer, R. K. (1999). The emergence of creativity. *Philosophical Psychology, 12*, 447–469. https://doi.org/10.1080/095150899105684

Sawyer, R. K. (2018). How artists create: An empirical study of MFA painting students. *The Journal of Creative Behavior, 52*, 127-141. https://doi.org/10.1002/jocb.136

Selby, E. C., Shaw, E. J., & Houtz, J. C. (2005). The creative personality. *Gifted Child Quarterly, 49*, 300-314. http://dx.doi.org/10.1177/001698620504900404

Sheldon, K. M., Ryan, R. M., Rawsthorne, L. J., & Ilardi, B. (1997). Trait self and true self: Cross-role variation in the Big-Five personality traits and its relations with psychological authenticity and subjective well-being. *Journal of Personality and Social Psychology, 73*, 1380–1393. https://doi.org/10.1037/0022-3514.73.6.1380

Sheldon, K. M. (1995). Creativity and self-Determination in personality. *Creativity Research Journal, 8*(1), 25–36. https://doi.org/10.1207/s15326934crj0801_3

Shepard, A., Tadik, H., & Runco, M.A. (2019). *How much creative potential is expressed at*

work? Manuscript submitted for publication.

Silvia, P. J. (2012). Curiosity and motivation. In R. M. Ryan (Ed.), *Oxford library of psychology. The Oxford handbook of human motivation* (pp. 157-166). New York, NY, US: Oxford University Press.

Silvia, P. J., Fayn, K., Nusbaum, E. C., & Beaty, R. E. (2015). Openness to experience and awe in response to nature and music: Personality and profound aesthetic experiences. *Psychology of Aesthetics, Creativity, and the Arts, 9,* 376-384. https://doi.org/10.1037/aca0000028

Silvia, P. J., Nusbaum, E. C., Berg, C., Martin, C., & O'Connor, A. (2009). Openness to experience, plasticity, and creativity: Exploring lower-order, high-order, and interactive effects. *Journal of Research in Personality*, *43,* 1087–1090. https://doi.org./10.1016/j.jrp.2009.04.015

Simms, L. J., Zelazny, K., Williams, T. F., & Bernstein, L. (2019). Does the number of response options matter? Psychometric perspectives using personality questionnaire data. *Psychological Assessment, 31,* 557–566. https://doi.org/10.1037/pas0000648.supp

Simon, H. A. (1983). Discovery, invention, and development: human creative thinking. *Proceedings of the National Academy of Sciences*, *80*(14), 4569 LP-4571. https://doi.org/10.1073/pnas.80.14.4569

Simonton, D. K. (1990). History, chemistry, psychology, and genius: An intellectual autobiography of historiometry. In M. A. Runco & R. S. Albert (Eds.), *Theories of creativity* (pp. 92-115). Newbury Park, CA: Sage.

Simonton, D. K. (2004). Exceptional creativity and chance: Creative thought as a stochastic combinatorial process. In L. V. Shavinina & M. Ferrari, (Eds.), *Beyond knowledge:*

Extracognitive aspects of developing high ability (pp. 39-72). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Simonton, D. K. (2012). Taking the U.S. Patent Office Criteria Seriously: A Quantitative Three-Criterion Creativity Definition and Its Implications. *Creativity Research Journal, 24*, 97–106. https://doi.org/10.1080/10400419.2012.676974

Simonton, D. K. (2013). Creative thought as blind variation and selective retention: Why creativity is inversely related to sightedness. *Journal of Theoretical and Philosophical Psychology*, *33*(4), 253–266. https://doi.org/10.1037/a0030705

Simonton, D. K. (2015). Thomas Edison's creative career: The multilayered trajectory of trials, errors, failures, and triumphs. *Psychology of Aesthetics, Creativity, and the Arts, 9*, 2–14. https://doi.org/10.1037/a0037722

Simonton, D. K. (2017). Creative genius and psychopathology: Creativity as positive and negative personality. In G. J. Feist, R. Reiter-Palmon, & J. C. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (pp. 235-250). New York, NY, US: Cambridge University Press.

Smith, G. T., McCarthy, D. M., & Zapolski, T. C. B. (2009). On the value of homogeneous constructs for construct validation, theory testing, and the description of psychopathology. *Psychological Assessment, 21*, 272-284. https://doi.org/10.1037/a0016699

Soto, C. J. (in press). How replicable are links between personality traits and consequential life outcomes? The Life Outcomes of Personality Replication Project. *Psychological Science.*

Sowden, P. T., Pringle, A., & Gabora, L. (2015). The shifting sands of creative thinking: Connections to dual-process theory. *Thinking & Reasoning, 21*, 40-60.

http://dx.doi.org/10.1080/13546783.2014.885464

Sternberg, R., Kaufman, J., & Roberts, A. (2019). The Relation of Creativity to Intelligence and Wisdom. In J. Kaufman & R. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (Cambridge Handbooks in Psychology, pp. 337-352). Cambridge: Cambridge University Press. doi:10.1017/9781316979839.018

Sternberg, R., & Lubart, T. (1991). An investment theory of creativity and its development. *Human Development, 34*, 1-31. https:/doi.org/10.1159/000277029

Sternberg, R., & Lubart, T. (1992). Buy low and sell high: An investment approach to creativity. *Current Directions in Psychological Science, 1*, 1-5. https://doi.org/10.1111/j.1467-8721.1992.tb00002.x

Sternberg, R. J., & Lubart, T. I. (1993). Creative giftedness: A multivariate investment approach. *Gifted Child Quarterly, 37*, 7-15.https://doi.org/10.1177/001698629303700102

Sternberg, R. J., & Lubart, T. I. (1995). *Defying the crowd: Cultivating creativity in a culture of conformity*. New York: Free Press.

Suler, J. R. (1980). Primary process thinking and creativity. *Psychological Bulletin, 88*, 144. https://doi.org/10.1037/0033-2909.88.1.144

Taylor, C. L., Mckay, A. S., & Kaufman, J. C. (2017). Creativity and personality: Nuances of domain and mood. In G. J. Feist, R. Reiter-Palmon, & J. C. Kaufman (Eds.), *Cambridge handbooks in psychology. The Cambridge handbook of creativity and personality research* (pp. 167-186). New York, NY, US: Cambridge University Press.

Tegano, D. W. (1990). Relationship of tolerance of ambiguity and playfulness to creativity. *Psychological Reports, 66*, 1047-1056. https://doi.org/10.2466/PR0.66.3.1047-1056

Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job

performance. *Journal of Applied Psychology*, *88*, 500–517. https://doi.org/10.1037/0021-9010.88.3.500

Tett, R. P., & Guterman, H. A. (2000). Situation trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality*, *34*, 397–423. https://doi.org/10.1006/jrpe.2000.2292

Thrash, T. M., & Elliot, A. J. (2003). Inspiration as a psychological construct. *Journal of Personality and Social Psychology, 84*, 871-889. http://dx.doi.org/10.1037/0022-3514.84.4.871

Thrash, T. M., Maruskin, L. A., Cassidy, S. E., Fryer, J. W., & Ryan, R. M. (2010). Mediating between the muse and the masses: Inspiration and the actualization of creative ideas. *Journal of Personality and Social Psychology, 98*, 469. https://doi.org/10.1037/a0017907.

Thrash, T. M., Moldovan, E. G., Oleynick, V. C., & Maruskin, L. A. (2014). The psychology of inspiration. *Social and Personality Psychology Compass*, *8*, 495-510. http://dx.doi.org/10.1111/spc3.12127

Thomson, P., & Jaque, S. V. (2018). Childhood adversity and the creative experience in adult professional performing artists. *Frontiers in Psychology*, *9*, 111. https://doi.org/10.3389/fpsyg.2018.00111

Toplyn, G., & Maguire, W. (1991). The differential effect of noise on creative task performance. *Creativity Research Journal*, *4*, 337-347. https://doi.org/10.1080/10400419109534410

Torrance, E. P. (1964). Identifying the Creatively Gifted Among Economically and Culturally Disadvantaged Children. *Gifted Child Quarterly*, *8*, 171–176. https://doi.org/10.1177/001698626400800401

Torrance, E. (1966). Nurture of Creative Talents. *Theory into Practice, 5*(4), 168-202.

Torrance, E. P. (1973). Non-test indicators of creative talent among disadvantaged children. *Gifted Child Quarterly, 17*, 3-9. https://doi.org/10.1177/001698627301700101

Torrance, E. P. (1979). *The search for satori & creativity*. Buffalo, N.Y: Creative Education Foundation.

Torrance, E. P. (1980). Growing up creatively gifted: A 22-yr longitudinal study. *Creative Child & Adult Quarterly, 5*, 148-158, 170.

Torrance, E. P. (1981). Empirical validation of criterion-referenced indicators of creative ability through a longitudinal study. *Creative Child & Adult Quarterly, 6*(3), 136-140.

Torrance, E.P. (2000). *Research review for the Torrance Tests of Creative Thinking figural and verbal forms A and B.* Bensenville, IL: Scholastic Testing Service.

Torrance, E. P. (2002). *The manifesto: A guide to developing a creative career*. Westport, Conn: Ablex Pub.

Tyagi, V., Hanoch, Y., Hall, S. D., Runco, M., & Denham, S. L. (2017). The risky side of creativity: Domain specific risk taking in creative individuals. *Frontiers in Psychology*, *8*(FEB), 1–9. https://doi.org/10.3389/fpsyg.2017.00145

Unsworth, K. (2001). Unpacking creativity. *Academy of Management Review, 26,* 289-297. https://doi.org/10.5465/amr.2001.4378025

Vervalin, C. H. (1962). Just what is creativity. *Hydrocarbon processing*, *41*(10), 109-111.

von Stumm, S., Chung, A., & Furnham, A. (2011). Creative ability, creative ideation and latent classes of creative achievement: What Is the role of personality? *Psychology of Aesthetics, Creativity, and the Arts*, *5*, 107–114. https://doi.org/10.1037/a0020499

Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian & East European Psychology*, *42*(1), 7-97. https://doi.org/10.1080/10610405.2004.11059210

Wan, W. W., & Chiu, C.Y. (2002). Effects of novel conceptual combination on creativity. *The Journal of Creative Behavior*, *36*, 227–240. https://doi.org/10.1002/j.2162-6057.2002.tb01066.x

Wang, Y., & Wang, L. (2016). Self-construal and creativity: The moderator effect of self-esteem. *Personality and Individual Differences*, *99*, 184-189. https://doi.org/http://j.paid.2016.04.086

Westby, E. L., & Dawson, V. L. (1995). Creativity: Asset or burden in the classroom?. *Creativity Research Journal*, *8*, 1-10. https://doi.org/10.1207/s15326934crj0801_1

Weisberg, R. W. (1988). Problem solving and creativity. In R. J. Sternberg (Ed.), *The nature of creativity: Contemporary psychological perspectives* (pp. 148-176). New York, NY, US: Cambridge University Press.

Weiss, D. S. (1981). A multigroup study of personality patterns in creativity. *Perceptual and Motor Skills*, *52*, 735–746. https://doi.org/10.2466/pms.1981.52.3.735

Wolfradt, U., & Pretz, J. E. (2001). Individual differences in creativity: Personality, story writing, and hobbies. *European Journal of Personality*, *15*, 297-310. https://doi.org/10.1002/per.409

Woodman, R. W., & Schoenfeldt, L. F. (1990). An interactionist model of creative behavior. *The Journal of Creative Behavior*, *24*, 279-290. https://doi.org/10.1002/j.2162-6057.1990.tb00525.x

Zampetakis, L. A. (2010). Unfolding the measurement of the creative personality. *The Journal of Creative Behavior*, *44*, 105–123. https://doi.org/10.1002/j.2162-6057.2010.tb01328.x

Zedelius, C. M., & Schooler, J. W. (2016). The richness of inner experience: Relating styles of

daydreaming to creative processes. *Frontiers in Psychology*, *6*, 2063. https://doi.org/10.3389/fpsyg.2015.02063

Zhang, L. & Sternberg, R. J. (2011). Revisiting the investment theory of creativity. *Creativity Research Journal*, *23*, 229–238. https://doi.org/10.1080/10400419.2011.595974

Zuckerman, M. (2015). General and situation-specific traits and states: New approaches to assessment of anxiety and other constructs. In M. Zuckerman & C.D. Spielberger (Eds), *Emotions and anxiety: New concepts, methods, and applications* (pp. 133-174). New York, NY: Taylor & Francis.

Table 2.1

Sample of Constructs and Materials Reviewed During Item Development

components of convergent and divergent thinking and ideation	Basadur, 1995; Basadur, Runco, & Vega, 2000; Cramond, Matthews-Morgan, Bandalos, & Zuo, 2005; Guilford, 1956; Runco et al., 2001; Torrance, 1964
radical and incremental creativity	Gilson & Madjar, 2011
problem and gap-sensing, problem-finding, problem-structuring, and problem-solving	Basadur & Basadur, 2011; Mumford, Costanza, Threlfall, Baughman, & Reiter-Palmon, 1993; Runco & Chand, 1995
adapting and innovating	Kirton, 1976
generating, exploring, and evaluating	Finke, Ward, & Smith, 1992; Sowden, Pringle, & Gabora, 2014
tension and complexity	Averill, 1999; Barron, 1955; Barron & Harrington, 1981; Csikszentmihalyi, 1996; Runco, 1994; Runco, 1999
fluidity and androgyny	Csikszentmihalyi, 1996; Da Costa, Páez, Sánchez, Garaigordobil, & Gondim, 2015; Harrington & Andersen, 1981; Norlander, Erixon, & Archer, 2000
preference for novelty, adventure, and unique experiences	Epstein, Schmidt, & Warfel, 2008; Drevdahl & Cattell, 1958; Ritter et al., 2012
originality and need for originality	Barron, 1955; Eysenck, 1993; Harrington, Block, & Block, 1983; Joy, 2017; Runco & Albert, 1985
unconventionality, asynchrony, sense of self as different, marginality, non-conformity, norm-doubting, and a desire to push boundaries	Barron & Harrington, 1981; Cattani, & Ferriani, 2008; Ekvall, 1997; Gardner & Wolf, 1988; Guilford, 1973; Helson & Srivastava, 2002; Madjar, Greenberg, & Chen, 2011; Runco, 1994

independence, independence of judgement, and autonomy	Albert & Runco, 1988; Barron, 1955; Barron & Harrington, 1981; Helson, 1971; Helson & Srivastava, 2002; Feist, 1999b; Sheldon, 1995; Torrance, 1964; Wang & Wang, 2016
authenticity	Averill, 1999; Averill, 2009; Averill, Chon, & Hahn, 2001; Runco, 2015b; Torrance, 2002
playfulness or being childlike	Gardner, 1994; Russ, 2016; Russ & Dillon, 2011; Runco, 2016; Tegano, 1990 Torrance; 1979
ability to see new things in the familiar, attention to the unexpected, and questioning assumptions	De Bono, 1969; Gordon, 1961; Root-Bernstein, 1988; Rosenman, 1988; Runco, 1999; Runco, 2015b
sensitivity	Csikszentmihalyi, 1996; Gutbezahl & Averill, 1996; Martindale, 1977, 1999; Toplyn & Maguire, 1991; Vervalin, 1962; Weiss, 1981
intuition and primary processes	Barron & Harrington, 1981; Martindale, 2007; Runco & Behleda,1986; Torrance, 1966; Suler, 1980; Wolfradt & Pretz, 2001
imagination, seeing new possibilities, daydreaming, mind-wandering, and fantasy-proneness	Butler, 2006; Hebert, 2013; McCain, Gentile, & Campbell, 2015; Feist, 1999; McMillan, Kaufman, & Singer, 2013; Mellou, 1995; Root-Bernstein & Root-Bernstein, 2006; Runco & Pina, 2013; Thomson & Jaque, 2018; Vygotsky, 2004; Zedelius & Schooler, 2016
tendency toward discovery and experimentation	Csikszentmihalyi & Getzels, 1971, 1973; Root-Bernstein, 1988; Sawyer, 1992, 1999, 2018; Simon, 1983; Simonton, 2013, 2015; Torrance, 1964
tolerance for ambiguity	Tegano, 1990; Torrance, 1979
risk-taking	Tyagi, Hanoch, Hall, Runco, & Denham, 2017

associative thinking and conceptual combination	Acar & Runco, 2014; Benedek, Könen, & Neubauer, 2012; Gough, 1976; Hunter, Mumford, & Byrne, 2009; MacKinnon, 1962, Mednick, 1962; Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 2009; Perkins, 1983; Rothenberg, 1971; Wan & Chiu, 2011
inspiration	Oleynick, Thrash, LeFew, Moldovan, & Kieffaber, 2014; Thrash & Elliot, 2003; Thrash et al., 2010
curiosity	Hunter, Abraham, Hunter, Goldberg, & Eastwood, 2015; Kashdan et al., 2018; Karwowski, 2012; Silvia, 2012
insight, perceptiveness, sensitivity to subtle cues, and pattern recognition	Baron, 2006; Davis, 1999; Mumford, Baughman, Maher, Costanza, & Supinski, 1997; Mumford & Whetzel, 1996; Root-Bernstein & Root-Bernstein, 1999; Runco, 1999; Weisberg, 1988
wide interests or knowledgebase	Epstein, Schmidt, & Warfel, 2008; Gruber, 1988; Root-Bernstein & Root-Bernstein, 2004
domain-specific knowledge	An, Song, & Carr, 2016; An & Runco, 2016; Csikszentmihalyi, 1988; Cropley, 2006; Rietzschel, Nijstad, & Stroebe, 2007
wide attentional focus	Carson, Peterson, & Higgins, 2003; Eysenck, 1993
motivation for creative behavior, passion, and creativity-supportive attitudes	Acar & Runco, 2014; Amabile, 1983; Amabile, 1997; Collis & Amabile, 1999; Basadur & Hausdorf, 1996; Csikszentmihalyi, 1996; Basadur, Runco, & Vega; 2000, Torrance, 1973, Unsworth, 2001
openness to experience, new perspectives, differences, and aesthetics	Li et al., 2015; McCrae, 1987; Helson & Srivastava, 2002; Silva et al., 2009

adaptation, flexibility, shifting perspectives, reflection, desire for improvement, inward focus, and tolerance for mistakes	Cohen, 2012; Cohen & Ambrose, 1999; De Bono, 1969; Feist, 1998; Gruber, 1981; Guastello, 1998; Guastello, & Hanson, 2004; Maslow, 1962; Meneely & Portillo, 2005; Runco, 2015b; Silvia et al., 2009; Sternberg & Lubart, 1993; Torrance, 1979, 2002 Maslow, 1962
sense of self as creative	Barron & Harrington, 1981; Karwoski & Lebuda, 2016

Table 2.2

CP-PC Items Included in Pilot Study

Item	Text	Area of Potential
1	Different. You are not like most other people.[a]	Sense of self as different, asynchrony (Gardner & Wolf, 1988; Runco, 1994)
2	Creative. You think or act in a creative fashion.[a]	Sense of self as creative (Barron & Harrington, 1981; Karwowski, Lebuda, & Wiśniewska, 2018)
3	A Nonconformist. You are not afraid to ruffle some feathers, to go against what the crowd is doing.[b]	Nonconformity (Feist, 1998)
4	Authentic. You are yourself and do not try to be someone you think you should be.[a]	Authenticity (Averill, 1999, 2009; Averill, Chon, & Hahn, 2001)
5	Perceptive. You notice things. Details that others miss are obvious to you. [b]	Perceptiveness/insight (Davis, 1999; Weisberg, 1988)
6	Adaptive. You change how you think or behave based on new information or experiences. [b]	Adaptiveness and openness to change (Cohen & Ambrose, 1999; Cohen, 2012)
7	Complex. The are many different sides to who you are.	Personal complexity (Barron, 1955)
8	Fluid. You do not fit into stereotypes or social prescriptions of being one thing or another.	Rejection of social norms and categorizations (Guilford, 1973; Feist, 1998)
9	Connected. You respond strongly to things like music, art, and nature.	Sensitivity to aesthetic experiences (Runco & Behleda,1986; Silvia, Fayn, Nusbaum, & Beaty, 2015)
10	In-tune. You sense when something is wrong or could be improved.[c]	Problem-finding (Csikszentmihalyi & Getzels, 1988), sensitivity to context (Torrance, 1966), intuition (Simon, 1983)
11	Self-directed. You prioritize your own standards, rather than those of others.	Independence of judgement (Barron, 1955)

12	An Experimenter. You don't do things in an orderly, linear fashion. You need to be able to see how one thing or another works before committing to what to do next.	Blind variation and selective retention (Campbell, 1960; Simonton, 2013)
13	An Explorer. You try or consider many ways of doing things.	Resistance to premature closure (Torrance, 1979), discovery-oriented behavior (Csikszentmihalyi & Getzels, 1971)
14	Open. You are willing to consider strange or unique ideas or courses of action.[c]	Openness to ideas or behavior that breaks existing conceptual barriers (Torrance, 1964)
15	Curious. You engross yourself in new information, activities, or hobbies.	Curiosity (Hunter, Abraham, Hunter, Goldberg, & Eastwood, 2015; Karwowski, 2012)
16	Playful. You enjoy banter, cleverness, and life being game-like.	Playfulness (Runco, 2016; Russ, 2016)
17	Imaginative. You think of lots of new ideas and possibilities.	Imagination (Root-Bernstein & Root-Bernstein, 2006; Runco & Pina, 2013)
18	Integrative. You find connections between different ideas and concepts, even if they don't seem related at first.[c]	Associative thinking (Benedek, Könen, & Neubauer, 2012; Mednick, 1962)
19	Inspired. You can find inspiration everywhere, even in everyday things.	Transformation of the familiar (Gordon, 1961), inspiration (Thrash and Elliot, 2003)
20	Thoughtful. You try to understand how things have been done before, so that you can improve upon them.	Gaining and elaborating on domain knowledge (Cropley, 2006; Sawyer, 1992, 1999, 2018)
21	Aware. You are able to think of solutions to problems that haven't been figured out.[c]	Problem evaluation (Basadur, 1995)
22	Passionate. When something grabs your interest, it really grabs your interest.	Focused intrinsic interests (Amabile, 1983)
23	Independent. You prefer to disregard rules that don't make much sense.	Independence (Albert & Runco, 1988; Torrance, 1964)

[a]Item from SRCT [b]Item adapted from SRCT [c]Item adapted from RIBS

Table 2.3

Modifications to CP-PC Items After Pilot

Item	Pilot	Study Two
4	Authentic. You are yourself and do not try to be someone you think you should be.	Authentic. You are genuine, real, true to yourself.
11	Self-directed. You prioritize your own standards, rather than those of others.	Self-directed. Even if there is a set way of doing something, you are likely to question or modify it.
12	An Experimenter. You don't do things in an orderly, linear fashion. You need to be able to see how one thing or another works before committing to what to do next.	A Divergent Thinker. Your thought process goes in many different directions.[a]
21	Aware. You are able to think of solutions to problems that haven't been figured out.	Aware. You can identify solutions for problems that haven't been figured out.
22	Passionate. When something grabs your interest, it really grabs your interest.	Passionate. When a topic or activity grabs your interest, you dive deeply into learning about it or doing it.

[a] Overinclusive thinking, low latent inhibition, perceptual openness (Carson, Peterson, & Higgins, 2003; Eysenck, 1993)

Table 2.4

Items Added to CP-PC for Study Two

Item	Items New to Study Two	Area of Potential
24	Accepting. You are comfortable around people who others think are different or strange.	Marginality (Cattani & Ferriani, 2008; Runco, 1994)
25	Autonomous. You enjoy doing things your own way, figuring out your own path.	Autonomy (Barron & Harrington, 1981)
26	Full of Ideas. You have so many ideas it sometimes feels like your ideas have ideas.	Ideational fluency (Guilford, 1956; Hocevar, 1979)
27	Childlike. You ask a lot of questions, and don't take initial explanations for granted.	Inquisitiveness, retention of childlike approach to situations (Torrance; 1979; Gardner, 1994)
28	Multifaceted. You can be different things at the same time - happy and sad, reckless and calculated...	Paradoxical traits (Csikszentmihalyi, 1996), cognitive complexity (Charlton & Bakan, 1989; Cropley, 1999)
29	Adventurous. You like the idea of exploring the unfamiliar.	Openness to potential diversifying experiences (Ritter et al., 2012)
30	Boundary-breaking. You enjoy pushing boundaries in what you do.	Radical creativity (Ekvall, 1997; Madjar, Greenberg, & Chen, 2011)
31	A Noticer. You pay attention to the unexpected - things that are surprising, novel, unique.	Alertness to the unexpected (Perkins, 1983; Root-Bernstein, 1988; Rosenman, 1988)
32	Evolving. You actively look for ways to learn and grow.	Tendency toward improvement, breaking away from habits, and integrating new information into cognitive structures (Maslow, 1962; Torrance, 1979)
33	Broad-minded. You enjoy solving problems with multiple possible answers	Attraction to ill-structured problems; preference for idea generation (Finke, Ward, & Smith, 1992)

	more than those with just one correct answer.	
34	Unconventional. You think of new ways to do things, like use words or change your appearance.	Unconventionality and capacity for original interpretations (Barron & Harrington, 1981; Runco, 2016); self-expressive everyday creativity (Ivcevic & Mayer, 2009)
35	Sensitive. You are moved by the beauty or tragedy in things you encounter.	Sensitivity (Csikszentmihalyi, 2013; Feist, 1998; Martindale, 1999)
36	A Daydreamer. You regularly get lost in thoughts and reflection.	Sensitivity to and absorption in internal world, fantasy-proneness (McCain et al., 2015; McMillan, Kaufman, & Singer, 2013)
37	Psychologically-minded. You explore connections, patterns, and deeper meanings.	Psychological-mindedness (MacKinnon, 1965)
38	A Unique Thinker. Others find your ideas surprising, but to you they seem obvious.	Originality (Gardner, 1994; Runco & Jaeger, 2012), the ability to surprise others with ideas (Simonton, 2012)
39	Divergent. You easily think of multiple perspectives from which to view problems or situations.	Flexibility (Runco & Chand, 1995)
40	An Improver. You see ways to make others' ideas better.	Incremental creativity (Gilson & Madjar, 2011), problem-construction (Mumford, Costanza, Threlfall, Baughman, & Reiter-Palmon, 1993)
41	Interested. You like to learn about many different topics, from watch-making to marine biology.	Broad interests (Barron & Harrington, 1981); gaining of tacit knowledge (Cropley, 2006)
42	Empathetic. It is easy for you to feel the pain and joy of others.	Sensitivity to the experiences of others (Guilford; 1973; Gutbezahl & Averill, 1996; Torrance, 1973)
43	A Novelty Seeker. You get restless always doing the same old thing. .	Preference for novelty (Baas, Nijstad, Boot & De Dreu, 2019; Martinsen, 1993)

CHAPTER 3

PILOT TEST OF THE CREATIVE PERSONALITY-POTENTIAL COMPOSITE

Introduction

This chapter reports the results of a small study to pilot-test an initial, 23-item, version of the Creative Personality-Potential Composite (CP-PC) prior to administration of the measure to a larger sample. The sample used in this study consisted of 53 participants who completed study measures through online research participant pool and survey platforms. The results indicated that CP-PC scores were moderately to strongly related to ideational behavior, two conceptualizations of openness to experience, as well as to creative activity and accomplishment. Hierarchical regressions indicated that the CP-PC predicted ideational behavior above and beyond two conceptualizations of openness to experience. Creative activity and accomplishment was only incrementally predicted above and beyond one of the openness indices. An exploratory factor analysis was conducted, but many items did not exhibit a clear or consistent pattern of loadings and there were issues with model stability. Implications for future validation studies and modifications to the CP-PC are discussed in light of these results.

Background

Although there are a number of available tools to estimate creative personality and creative potential, present measurement instruments have some limitations (e.g., Zampetakis, 2010). The present study is a small pilot, which focused on validating a new measure of creative potential, the Creative Personality-Potential Composite (CP-PC). The CP-PC was designed to estimate trait-based creative potential and was developed with the use of a broad literature

review focused on constructs relevant to creative personality and creative potential. The goal of the present study was to facilitate measure refinement and development for subsequent studies. The items piloted in this study can be viewed in Appendix 3A. Several items were borrowed or adapted from either the Self Report of Creative Traits (Runco, Acar, & Cayirdag, 2017) or the Runco Ideational Behavior Scale (Runco, Plucker, & Lim, 2001), with the permission of the first author. Because these measures are relevant to creative traits and creative potential and have evidenced sufficient psychometric properties in past studies, it was logical to use these items as a starting point.

Method

This study was a quantitative and cross-sectional pilot of the CP-PC. An overarching research question guided the study design: What are the psychometric properties of the CP-PC?. Data were collected on several variables to explore this research question. Because trait-openness to experience has been found to be a robust personality-specific predictor of a range of creativity-specific variables, including diverse measures of creative personality and potential (e.g., Furnham, 2017; Puryear, Kettler, & Rinn, 2017), it was a reasonable measure of convergent validity in the present study. Based on prior research, the CP-PC should be moderately to strongly related to the openness measures, and the relationship should be statistically significant. Scales reflecting two different conceptualizations of openness to experience were used and are described in the Measures section. Indicators of real-world creative behavior and ideational behavior were utilized as criteria to estimate criterion-related validity. Ideational behavior reflects creative potential specific to ideation, while real-world creative behavior reflects creative potential that has been expressed in some way. Because ideational behavior and the CP-PC both reflect creative potential, because items to measure ideational

behavior were used to develop the CP-PC items, and since the measure of ideational behavior was modified to reflect dispositional ideational behavior (see below), the CP-PC should have a stronger relationship with and thus, better predictive ability for, ideational behavior than expressed creative behavior. The relationship between the CP-PC and expressed creative behavior should be positive, but depending on the extent of expression of creative potential in the sample, the relationship may or may not be statistically significant, and it is possible the effect size (indicated by the Pearson correlation) will be small.

A range of descriptive statistics were examined, and analyses employed, to explore the research question noted above. Planned analyses included calculation of the bivariate correlations between the CP-PC and the other study variables and an exploratory factor analysis. Additional analyses that were exploratory in nature were also conducted. These included hierarchical multiple regression analyses to explore the concurrent predictive validity of the CP-PC for the two criteria variables above and beyond each of the openness indices.

Sample

Participants were 61 undergraduate students from a large Southeastern University in the United States who were 18 years of age or older. The survey was administered entirely online. Due to failure of an attention check (utilized to determine whether participants were reading items versus responding randomly; $n = 4$) or taking an unrealistically short amount of time to complete the survey (less than 30 seconds to read the consent from/measure instructions and less than 3 seconds per item; $n = 4$), eight total participants were excluded from the analyses. This left a final sample of 53 (46 female); there were no missing data. Participant age ranged from 18 to 24 ($M = 19.6$, $SD = 1.2$). Participants reported the following demographic characteristics: 49 (92.5%) identified as White, 1 (1.9%) Hispanic, Latino/a, or Spanish origin, 1 (1.9%) Asian, and

2 (3.8%) as a member of more than one group listed. Students registered for the study through one of the university research pools and received course credit for their research participation.

Measures

Runco Ideational Behavior Scale (RIBS; Runco et al., 2001). The RIBS is a 23-item measure meant to provide an alternative to traditional product-based assessments of creative behavior. Instead, it focuses on ideation as a creative product (e.g., "I have always been an active thinker—I have lots of ideas"). It also provides a different kind of criterion-based assessment than creative activity and accomplishment checklists (described below), as activity checklists tend not to take ideation into account (Runco et al., 2001). Reliability and validity of the RIBs was supported in its validation study. For the purpose of the present study, scale instructions and response options were modified to be analogous to the CP-PC, both to decrease cognitive demand on participants and to allow for the inclusion of a measure that would be comparable in all but actual item content. Such an approach can help to identify issues with measure construction upon examining correlations between a new measure and those with similar and different structures (Bandalos, 2018).

Big-Five Aspects Openness and Intellect Scales (BFAS; DeYoung, Quilty, & Peterson, 2007). This 20-item scale was created to represent two *aspects* of openness to experience: openness and intellect. According to DeYoung et al., aspects are less broad than the trait they are a part of, but broader than facet-level constructs within traits in the five-factor model (FFM). Scales for the openness and intellect aspects have been found to be reliable and valid, and differentially predict creative achievement in arts and sciences above and beyond other personality traits, with openness showing the most overlap with the arts and intellect the sciences (Kaufman et al., 2016). Both aspects predicted scores on a measure of divergent thinking

(Puryear et al., 2017). Response options for the BFAS scales are presented on a 5-point Likert scale (*very inaccurate - very accurate*). Sample items include "I formulate ideas clearly" and "I see beauty in things that others might not notice". Eight items are reverse-scored.

Openness Factor Scale of the HEXACO Personality Inventory – Revised (HEXACO – PI-R; Ashton & Lee, 2009). Due to concerns that the intellect aspect of the BFAS may not *consistently* be related to creativity-specific variables (Nusbaum & Silvia, 2011), a more traditional and commonly used 10-item openness scale from another prominent conceptualization of personality, the HEXACO model, was also included. This scale has been found to be significantly and positively correlated with Gough's (1979) Creative Personality Scale (CPS) and several scales indicative of curiosity (Hunter, Abraham, Hunter, Goldberg, & Eastwood, 2016), which would indicate that it too was a reasonable choice for use in this study. The HEXACO scale includes items such as "I would enjoy creating a work of art, such as a novel, a song, or a painting". Response options are presented on a 5-point Likert scale (*strongly disagree-strongly agree)*. Five items are reverse-scored.

Creative Activity and Accomplishment Checklist. Creative Activity and Accomplishment Checklists present a way to address the *criterion problem* in creativity research and have evidenced consistent reliability and validity across studies over multiple decades (Paek & Runco, 2017). The version of the CAAC used for the present study was derived from that used by Shepard, Tadik, and Runco (2019), which includes 106 items across nine domains examining creative activities and accomplishments outside of work and school. To create a shorter version from this item pool, five items with strong inter-item correlations from four domains in Shepard et al. (2019) were selected to form a 20-item scale. The four domains are: everyday creativity, writing and language, music and visual arts, and math and science. A composite score was

calculated across domains. Due to the small sample size in this pilot study, specific domains of creative behavior were not analyzed separately. On the CAAC, respondents are asked to indicate how often they have engaged in creative activities (e.g., "Written a story, book, or play"). Response anchors are on a 0 to 3 scale (*never, once or twice, three-five times, five or more times*). Participants were asked to only indicate creative activities that they engaged in outside of formal work or educational settings to provide an estimate of creativity that was more likely to be self-initiated (and thus reflective of actualized potential), as opposed to that which may have been required, and thus, to a greater extent, out of a participants' control.

Procedure

Participants accessed the survey through one of the university's online research systems, which redirected to an online survey platform. There, participants viewed the consent form and answered three demographic questions regarding age, sex, and ethnic identification. They then completed the measures in the following order: the CP-PC, the RIBS, the BFAS intellect and openness scales, the HEXACO openness scale, and the CAAC. The attention check was placed at the end of the BFAS scales and asked participants to select "Neither Agree Nor Disagree" as their response for the item. In total, individuals responded to 100 questions. Participants were allowed as much time as they desired to complete the survey but were instructed in the survey description to complete it in one sitting so that a general idea of survey completion time could be estimated for future studies.

Results

A number of planned analyses were conducted. First, data were examined for outliers and to check that assumptions for regression analyses were met. Univariate and multivariate outliers were fewer than three standard deviations from the mean, so all participant data were retained.

Mahalanobis distances were calculated for CP-PC scores to determine whether any one score exerted undue leverage; there were no problem data points. Skew, kurtosis, and Cronbach's alpha values for measures were all within acceptable limits (alpha values are reported in Table 3.1), though it is notable that the distribution of CP-PC scores had a negative skew. This was largely attributable to there being fewer scores at the bottom of the possible range for the measure, thus giving the distribution a long "tail." The visual depiction of the frequency distribution appeared otherwise normal. Item-level means, standard deviations, skew, and kurtosis were also examined. Item-level skew was again negative for several items, and there were several items with fairly high mean values (i.e. 19 of the 23 items had a mean above 4.0, with items 5 and 22 falling above 5.0). Corrected item-total correlations were also examined. Items 7, 11, 12, 21, 22, 23 showed corrected item-total correlations below .20. Other corrected item-total correlations ranged from .22 (authentic) - .60 (integrative).

Several bivariate regression analyses were conducted to better understand the relationships between the CP-PC and the other variables of interest, with confidence intervals calculated for beta values in light of the small sample size (see Table 3.2). The CP-PC showed the strongest correlations with the RIBS ($r = .69$, $p < .001$) and total BFAS score ($r = .65$, $p < .001$); these and all other relationships between the CP-PC and the outcome variables were statistically significant and positive.

Unplanned Regression Analyses Predicting Ideational Behavior and Creative Behavior

Because the bivariate correlations turned out as expected, several exploratory hierarchical regression analyses were also conducted to better understand the incremental predictive ability of the CP-PC controlling for openness to experience. Since openness to experience is a consistent correlate of creativity-specific variables, it is important to analyze whether measures of trait

creativity can provide additional information above and beyond those of openness to experience. The RIBS and CAAC scores were used as criteria for the analyses (see Tables 3.3 and 3.4). These analyses indicated that the CP-PC significantly predicted variance in ideational behavior above and beyond the HEXACO ($F(2, 50) = 22.95$, $p < .001$, $R^2 = .48$) and BFAS openness indices ($F(3,49) = 17.68$, $p < .001$, $R^2 = .52$) in the second step of each hierarchical multiple regression. Inclusion of the CP-PC scores in the models resulted in an additional 33.5 and 19.9% of variance predicted, respectively. An additional 5.8% of the variance in creative activities and accomplishments, as measured by the CAAC, was also explained by the CP-PC in Model Two above and beyond scores on the HEXACO measure of openness ($F(2, 50) = 24.68$, $p < .001$, $R^2 = .48$). Additional variance predicted by the CP-PC was not significant when measure scores were entered into a hierarchical model simultaneously with scores from the BFAS openness aspect scales. However, the F value for this model remained statistically significant ($F(3, 49) = 16.99$, $p < .001$, $R^2 = .51$).

Exploratory Factor Analyses of the CP-PC

Though the sample size was small, an exploratory factor analysis approach using maximum likelihood extraction was used to explore the dimensionality of the CP-PC and to obtain a preliminary understanding of whether the measure might be appropriately conceptualized as having subscales. First, all factors with an eigenvalue greater than one were extracted, resulting in eight factors. Bartlett's Test of Sphericity was significant ($\chi^2(254) = 429.94$, $p < .001$), which indicated sufficient correlation across test items. The value for the Kaiser-Meyer-Olkin (KMO) Test of Sampling Adequacy was .58. This indicated the EFA results should be interpreted cautiously; this value might be marginally acceptable by some standards, but far from ideal (Bandalos, 2018). Values nearer to 1.0 are preferable, as lower values indicate

that there may be large partial correlations amongst the items (unique variance not attributable to a common factor or factors). Upon extraction, the first factor was responsible for 9.08% of common variance across responses to items, the second factor 6.40, and the third through eighth 10.13, 10.91, 7.40, 5.60, 3.71, and 2.93 percent, respectively. The cumulative variance explained was 56.15%. Extracted item communalities ranged from .10 (experimenter) to .99 (authentic, self-directed, and curious). Several ultra-Heywood cases were present, indicating that communalities for those items exceeded one prior to correction by the SPSS software. This may result from issues with the number of extracted factors or with representation of the data by a factor model, or indicate that there are not enough data to provide a stable estimate. This again indicated that the resulting solution should be interpreted with caution (SAS Institute Inc., 2009). The cases were present for models with varying numbers of factors, so it is possible that the sample size was too small to properly fit a factor model or that the measure might be best conceptualized as unidimensional.

A scree plot showed leveling off at several places, so multiple factor solutions were explored. As some correlation between factors was expected, direct oblimin and promax rotations were also tested, and pattern and structure matrices examined. Looking across models, using a factor-loading of .30 as a cut-off criterion, several items tended to load together consistently (curious and explorer; aware, perceptive, and thoughtful; creative, imaginative, integrative, playful and open; and different, non-conformist, and fluid), while the remaining ten items (authentic, adaptive, complex, connected, in-tune, self-directed, experimenter, inspired, independent, passionate) were more prone to move or to load onto their own factor depending on how the data were modeled.

Discussion, Measure Refinement, and Implications for Study Two

First, this study provided preliminary evidence of reliability and validity for the CP-PC. The measure evidenced an acceptable, albeit lower than desired, Cronbach's alpha value at .78. Some corrected item-total correlations were also lower than desired. It is possible that some items were confusing or are more toward the fringes of the broad set of traits that confer creative potential. The small sample size could have also played a role these findings. Although there were relatively few scores in the potential range of lower values on the measure, both skew and kurtosis values were acceptable. It is possible that this is a characteristic of the sample, but it is also possible that this reflects the idea that everyone has some degree of creative potential (Runco, 2004).

The CP-PC showed moderate to large positive and statistically significant correlations with each of the other scales. In the hierarchical regressions, CP-PC scores predicted ideational behavior above and beyond the openness indices, which makes sense; the RIBS, like the CP-PC, is a measure of creative potential. It was also used to generate ideas for CP-PC items and had the same instructions and scale anchors in this study. In regard to creative behavior, the CP-PC scores predicted scores on the CAAC above and beyond the HEXACO conceptualization of openness, but the not the BFAS openness aspects simultaneously. Given that the CP-PC is meant to measure potential and not behavior itself, this is not entirely surprising. While being high in a trait will make associated behavior more likely (Feist, 2010), it is not guaranteed, and the expression of creative behavior can hinge on a number of other variables (Davis, 1999; Hunter, Bedell, & Mumford, 2007). Items on the BFAS openness scale are also biased toward the arts, so it is possible that the lack of incremental validity of the CP-PC could be a result of having more arts-focused (e.g., those about creativity in writing, language, visual, and performing arts) items

on the CAAC compared to those that query other forms of creativity. It is also possible that because the CP-PC was designed to measure creative potential, it might be more strongly related to creativity that does not require domain knowledge or that which is more readily expressed during the course of day to day life, such as the various forms of everyday creativity. Finally, the factor analysis indicated possible preliminary item sets within the measure but given the small sample size and instability of the models, the factor analysis should be repeated so that a higher degree of confidence in results can be achieved.

Based on the results of this pilot, several modifications were made to the CP-PC in preparation for Study Two. A literature review and review of measures conducted to develop items, as well as unused items developed for the pilot, were revisited. Additional measures were also examined, including a measure of attitudes and values that reflect support for creativity (Acar & Runco, 2014, 2015) and two additional instruments that measure where and with whom individuals are creative (Runco, Acar, & Cayirdag, 2017). The last two focus on the expression of several traits associated with creativity and so were relevant. From this review, additional items were created and discussed with experts in the field. Specifically, new items were added on the basis that they might form factors with items used in the pilot study. Additionally, piloted items with low item-total correlations were examined to determine whether or not they might be confusing or especially difficult for participants. Several of these items were revised. Aside from the items that were modified, the items from the pilot were retained in their original form in preparation for the next study.

There were additional changes in the design of Study Two, informed by the pilot results. First, the HEXACO scale was not used for Study Two because the correlation between this measure and the CP-PC was similar to that between the BFAS openness scale and CP-PC. With

the two aspects, the BFAS provides more nuanced information. Additional CAAC items from the Shepard et al. (2019) study were added to the CAAC measure for Study Two, both to increase potential variance (given that it is possible, at most, to receive a score of three for any given CAAC item) and to address the potential issues noted above (e.g., possible over-focus on arts-specific items). Instead of a composite everyday creativity scale, three full everyday creativity subscales were included in Study Two (consistent with the approach taken by Shepard et al., 2019). This was with the goal of understanding the relationship between the CP-PC and everyday creativity more specifically, given that the everyday items are more domain general and may be better predicted by individuals' degree of creative potential.

Limitations

The pilot study had several limitations. First, as is often the case with pilots, the sample size was small, which could have played a role in some of the issues with the EFA models; clearly, the next study should utilize a larger sample and retest the dimensionality of the CP-PC. Second, there was not much variability in terms of participant age or sex, so the follow-up study should draw a more diverse sample from the general population. Third, and relatedly, the sample was collected from one college within one university, so again, a more diverse sample should be collected to see if results from the pilot are reproduced. These limitations were noted, and efforts made to address them, in design of the second study.

References

Abraham, A. (2016). Gender and creativity: An overview of psychological and neuroscientific literature. *Brain Imaging and Behavior, 10,* 609-618. https://doi.org/10.1007/s11682-015-9410-8

Acar, S., & Runco, M. A. (2014). Assessing associative distance among ideas elicited by tests of divergent thinking. *Creativity Research Journal*, *26*, 229–238. https://doi.org/10.1080/10400419.2014.901095

Acar, S. & Runco, M. A. (2015). Thinking in multiple directions: Hyperspace categories in divergent thinking. *Psychology of Aesthetics, Creativity, and the Arts*, *9*, 41–53. https://doi.org/10.1037/a0038501

Ashton, M. C., & Lee, K. (2009). The HEXACO-60: A short measure of the major dimensions of personality. *Journal of Personality Assessment, 91,* 340-345. https://doi.org/10.1080/00223890902935878

Davis, G. A. (1999). Barriers to creativity and creative attitudes. In M.A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity*, pp. 165-174. San Diego, CA: Academic Press.

Feist, G. J. (2010). The function of personality in creativity: The nature and nurture of the creative personality. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 113-130). New York, NY, US: Cambridge University Press. https://doi.org/10.1017/CBO9780511763205.009

Furnham, A. (2017). Personality Traits, Personality Disorders, and Creativity. In G. Feist, R. Reiter-Palmon, & J. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (Cambridge Handbooks in Psychology, pp. 251-272). Cambridge: Cambridge University Press. doi:10.1017/9781316228036.014

Gough, H. G. (1979). A Creative Personality Scale for the Adjective Check List. *Journal of Personality and Social Psychology, 37,* 1398–1405. https://doi.org/10.1037/0022-3514.37.8.1398

Hunter, J. A., Abraham, E. H., Hunter, A. G., Goldberg, L. C., & Eastwood, J. D. (2016). Personality and boredom proneness in the prediction of creativity and curiosity. *Thinking Skills and Creativity, 22,* 48-57. https://doi.org/10.1016/j.tsc.2016.08.002

Kaufman, S. B., Quilty, L. C., Grazioplene, R. G., Hirsh, J. B., Gray, J. R., Peterson, J. B., & DeYoung, C. G. (2016). Openness to experience and intellect differentially predict creative achievement in the arts and sciences. *Journal of Personality*, *84*. https://doi.org/10.1111/jopy.12156

Nusbaum, E.C. & Silvia, P.J. (2011). Are openness and intellect distinct aspects of openness to experience? A test of the O/I model. *Personality and Individual Differences, 51(5),* 571-574.

Paek, S. H., & Runco, M. A. (2017). Dealing with the criterion problem by measuring the quality and quantity of creative activity and accomplishment, *Creativity Research Journal 29*, 167–173. https://doi.org/10.1080/10400419.2017.1304078

Puryear, J. S., Kettler, T., & Rinn, A. N. (2017). Relationships of personality to differential conceptions of creativity: A systematic review. *Psychology of Aesthetics, Creativity, and the Arts*, *11*, 59–68. https://doi.org/10.1037/aca0000079

DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology, 93*(5), 880–96. https://doi.org/10.1037/0022–3514.93.5.880

Runco, M. A., Acar, S., & Cayirdag, N. (2017). A closer look at the creativity gap and why

students are less creative at school than outside of school. *Thinking Skills and Creativity*, *24*, 242-249. https://doi.org/10.1016/j.tsc.2017.04.003

Runco, M. A., Plucker, J. A., & Lim, W. (2001). Development and psychometric integrity of a measure of ideational behavior. *Creativity Research Journal*, *13*, 393-400. https://doi.org/10.1207/S15326934CRJ1334_16

SAS Institute Inc. (2009). *SAS/STAT® 9.2 User's guide* (2nd ed.) Cary, NC: SAS Institute Inc.

Shepard, A., Tadik, H., & Runco, M.A. (2019). *How much creative potential is expressed at work?* Manuscript submitted for publication.

Zampetakis, L. A. (2010). Unfolding the measurement of the creative personality. *The Journal of Creative Behavior*, *44*, 105–123. https://doi.org/10.1002/j.2162-6057.2010.tb01328.x

Table 3.1

Descriptive Statistics for Pilot Variables (n = 53)

				Range	
Variable	*M*	*SD*	*α*	Potential	Actual
CP-PC	100.59	10.95	.77	23-138	81-132
RIBS	85.83	20.62	.95	23-138	38-137
HEXACO-O	32.28	6.59	.76	10-50	16-47
BFAS-T	70.66	10.52	.81	20-100	45-99
BFAS -I	34.23	5.78	.75	10-50	20-50
BFAS-O	36.43	7.31	.82	10-50	16-49
CAAC Total	18.21	8.77	.82	0-60	4-39

Note. CP-PC = Creative Personality-Potential Composite; RIBS = Runco Ideational Behavior Scale; HEXACO-O = HEXACO openness to experience scale; BFAS-Total = Big Five Aspects Scales openness and intellect total score; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; CAAC Total = Creative Activity and Accomplishment Checklist total score.

Table 3.2

Bivariate Correlations of CP-PC with Pilot Study Variables (n = 53)

Variable	β	95% CI
RIBS	.69***	[.49, .90]
HEXACO-O	.52***	[.28, .76]
BFAS-T	.65***	[.44, .87]
BFAS-I	.60***	[.37, .82]
BFAS-O	.47***	[.29, .72]
CAAC Total	.55***	[.32, .79]

Note. CP-PC = Creative Personality-Potential Composite; RIBS = Runco Ideational Behavior Scale; HEXACO-O = HEXACO openness to experience scale; BFAS-T = Big Five Aspects Scales openness and intellect total score; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; CAAC Total = Creative Activity and Accomplishment Checklist total score.
***$p < .001$.

Table 3.3

Hierarchical Regression Analyses for Openness and CP-PC Predicting Ideational Behavior (n = 53)

	Model 1			Model 2		
Variable	*B*	*SE*	β	*B*	*SE*	β
Regression One						
(intercept)	47.50**	13.36		-45.19*	19.45	
HEXACO-O	1.19	.41	.38**	.08	.38	.03
CP-PC				1.28	.23	.68***
R^2		.14			.48	
Δ*F*		8.57**			32.12***	
Regression Two						
(intercept)	8.80	16.64		-48.13*	18.96	
BFAS-O	1.20	.34	.42**	.65	.32	.23*
BFAS-I	.98	.43	.27*	-.11	.44	-.03
CP-PC				1.14	.25	.60***
R^2		.32			.52	
Δ*F*		11.81***			20.29***	

Note. CP-PC = Creative Personality-Potential Composite; HEXACO-O = HEXACO openness to experience scale; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience.

* p < .05. ** p < .01. *** p < .001.

Table 3.4

Hierarchical Regression Analyses for Openness and CP-PC Predicting Creative Activity and Accomplishment (n = 53)

	Model 1			Model 2		
Variable	*B*	*SE*	β	*B*	*SE*	β
Regression One						
(intercept)	-10.24*	4.60		-26.64**	8.12	
HEXACO -O	.88	.14	.66***	.69	.16	.52***
CP-PC				.23	.09	.28*
R^2		.44			.50	
Δ*F*		39.88***			5.77*	
Regression Two						
(intercept)	-21.81**	6.14		-29.90**	8.14	
BFAS-O	.65	.13	.54***	.57	.14	.47***
BFAS-I	.48	.16	.32**	.33	.19	.22
CP-PC				.16	.11	.20
R^2		.49			.51	
Δ*F*		23.78***			2.23	

Note. CP-PC = Creative Personality-Potential Composite; HEXACO-O = HEXACO openness to experience scale; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience.

*p < .001. **p < .01. ***p < .001.

Appendix 3A

Items Used in Pilot Study

Item	Text
1	Different. You are not like most other people.[a]
2	Creative. You think or act in a creative fashion.[a]
3	A Nonconformist. You are not afraid to ruffle some feathers, to go against what the crowd is doing.[b]
4	Authentic. You are yourself and do not try to be someone you think you should be.[a]
5	Perceptive. You notice things. Details that others miss are obvious to you. [b]
6	Adaptive. You change how you think or behave based on new information or experiences. [b]
7	Complex. The are many different sides to who you are.
8	Fluid. You do not fit into stereotypes or social prescriptions of being one thing or another.
9	Connected. You respond strongly to things like music, art, and nature.
10	In-tune. You sense when something is wrong or could be improved.[c]
11	Self-directed. You prioritize your own standards, rather than those of others.
12	An Experimenter. You don't do things in an orderly, linear fashion. You need to be able to see how one thing or another works before committing to what to do next.
13	An Explorer. You try or consider many ways of doing things.
14	Open. You are willing to consider strange or unique ideas or courses of action.[c]
15	Curious. You engross yourself in new information, activities, or hobbies.
16	Playful. You enjoy banter, cleverness, and life being game-like.
17	Imaginative. You think of lots of new ideas and possibilities.
18	Integrative. You find connections between different ideas and concepts, even if they don't seem related at first.[c]
19	Inspired. You can find inspiration everywhere, even in everyday things.

20	Thoughtful. You try to understand how things have been done before, so that you can improve upon them.
21	Aware. You are able to think of solutions to problems that haven't been figured out.[c]
22	Passionate. When something grabs your interest, it really grabs your interest.
23	Independent. You prefer to disregard rules that don't make much sense.

[a]Item from SRCT [b]Item adapted from SRCT [c]Item adapted from RIBS

CHAPTER 4

ACCOUNTING FOR COMPLEXITY, DOMAINS, INTRAPERSONAL BARRIERS, AND CONTEXTUAL INFLUENCES, OH MY!: VALIDATION OF A NEW MEASURE TO IDENTIFY TRAIT-BASED CREATIVE POTENTIAL[1]

[1]Shepard, Aubra. To be submitted to the Creativity Research Journal.

Abstract

This manuscript focuses on the development and validation of a new self-report measure of trait-based creative potential, the Creative Personality-Potential Composite. Measures of ideational behavior, openness to experience, creative self-concept, neuroticism, and creative activity and accomplishment were administered to an online sample of 368 participants (results of a smaller pilot study are also reported). Several statistical analyses were conducted to explore the psychometric properties of the CP-PC. An examination of descriptive statistics and the results of the analyses indicated support for the CP-PC as a reliable and valid measure. Eight possible dimensions of the CP-PC were identified through exploratory factor analysis and further tested through the use of simultaneous multiple regressions predicting the other study variables. Limitations of the study are discussed, as are directions for future research and the possible relevance of the CP-PC measure to applied settings.

Background

Creative potential is an important area of focus that should be considered in attempts to measure creativity (Runco, 2007, 2008; Runco & Cayirdag, 2012) as the cultivation of creative potentials is beneficial to individuals and societies (Maslow, 1943; Csikszentmihalyi, 1996). In fact, Runco asserted that "If we want to use the research such that there is an impact, it is creative potential that should be targeted" (2017, p. 310). Barron (1955) argued that if some individuals are more likely to behave originally, while some are not, there must be a dispositional propensity for original behavior. The same can be said for other areas of creative potential; that there are traits that confer it (Feist, 1998). Because of their possible importance to understanding creativity, research on dispositional aspects of commonly studied constructs in the creativity literature has been called for (e.g., problem-finding; Pekins & Jay, 1997).

A notable consideration, relevant to the study of dispositions, is that numerous trait-environment or person-environment theories indicate that although traits lower the threshold for trait-congruent behavior (Feist, 2010), situational characteristics can either facilitate or inhibit trait expression (e.g., Tett & Burnett, 2003); there is ample support that this also applies to the expression of creativity (Amabile, 1997; Beghetto, 2014; Davis, 1999; Hunter, Bedell, & Mumford, 2007; Joy, 2017; Woodman & Schoenfeldt, 1990). This is further clarified by research that has found that traits associated with creative thought or behavior receive variable support across different contexts, with support appearing to be lower in formal environments such as school or the workplace (Paek & Sumners, 2017; Paek, Sumners, & Sharpe, 2019; Runco, Acar, & Cayirdag, 2017; Runco, Campbell, Jaeger, McCain, and Gentile, 2016; Shepard, Tadik, & Runco, 2019; Sumners, Abdulla, Paek, & Runco, in press). Resources needed to develop or express creative potential, such as thinking time, are not always provided, even if creative thought and behavior are desired. In such situations the expression of creative potentials suffers (Gallup, 2017; Unsworth & Clegg, 2010). This is unfortunate, especially given research that indicates that creative potentials can be developed and that there are benefits to doing so (Basadur, Runco, & Vega, 2000).

Failure to adequately support creative potentials may occur for several reasons. Creativity involves originality (Runco & Jaeger, 2012). Risk-averseness in the business world, or the need to smoothly manage a classroom, may make it difficult to accommodate originality and this may be especially true if individuals do not understand how to express it in a socially effective manner (Benner & Tushman, 2015; Edwards, 2001; Hodgson & Briand, 2013; Kaufman & Beghetto, 2013; Mueller, Melwani, & Goncalo, 2010). Creative potential and expressed creative behavior are also misunderstood (Basadur & Basadur, 2011), with lay individuals sometimes

holding implicit theories about creativity that do not include the range of traits or behaviors that actually contribute to creative thought or action (Dawson, D'Andrea, Affinito, & Westby, 2010; Sumners et al., 2017; Westby & Dawson, 1995). These beliefs may be based around myths or romantic notions about what creativity is, what creative people are like, the extent to which creativity can be developed, or the usefulness of creativity (Cropley, 2016; Paek & Sumners, 2017; Taylor, 2017). Individual-level barriers can also inhibit the development and expression of creative potentials if individuals fear criticism when sharing new ideas or experience concern about consequences associated with creative risk-taking (Richards, 2007). There are other barriers that may be cultural, psychological, emotional, or resource-related (Davis, 1999).

All of this taken together, there is no guarantee that creative potentials will be recognized, understood, supported, developed, or expressed, a sentiment that has been noted elsewhere (e.g., Torrance, 2000). And so, it is of little wonder that traits such as dominance, aggression, energy, and persistence have been found to characterize individuals who have had creative success (Barron & Harrington, 1981; Feist 1998, 1999a; Mumford & Gustafson, 1988). There is continued need for clearer understanding of creative potential and the various intrapersonal resources that confer it, its relationship to other constructs, the extent to which it is expressed, as well as measurement tools to identify it that explicitly take into account the role environments may play in its expression. It might also be especially useful to have a research tool that is not only applicable to academic work but that could also help individuals learn about their own potential creativity or that of others. Again, settings such as the workplace come to mind.

Measurement of creative potential can be categorized as either production-based, in which individuals are asked to do something creative, such as complete a test of divergent thinking, or resource-based, which involves administration of items that target conative and

cognitive factors that contribute to creativity, without requiring performance or product creation (Lubart, Zenasni, & Barbot, 2013). The present studies (a pilot, which is reported briefly, and a larger study) focused on the validation of a self-report resource-focused measure of trait-based creative potential (The Creative Personality-Potential Composite; CP-PC). Creativity is considered a complex or syndrome (Albert & Runco, 1988; MacKinnon, 1962; Mumford & Gustafson, 1988), meaning that there are many things that confer potential for creative thought or behavior, and many ways for creativity to be expressed (Runco, 2004). Runco, Nemiro, & Walberg (1998) stated that "creativity does not seem to be assigned to one specific cognitive, affective, social, or physical realm, but can instead draw on each" (p.15). As such, the CP-PC is a composite that targets enduring aspects of traits, cognitive processes, problem-approaches, attitudes, skills, and abilities that may confer creative potential. It is referred to as a measure of *trait-based* creative potential because there may be some disagreement about the extent to which the various items reflect traits. Still, measurement of both state and trait-based aspects of other psychological constructs has been done with success (e.g., Baumann, 2012; Castillo, Cooke, Macfarlane, & Aitken, 2016; Zuckerman, 2015), and given the influence of environments on trait-congruent behavior, such an approach is warranted so that estimates of potential are less likely to be contaminated by context effects that may suppress it.

Intersection of Creative Personality and Potential

Personality refers to "the relatively enduring styles of thinking, feeling, and acting that characterize an individual" (Costa, McCrae, and Kay, 1995, p. 124). Personality traits, including those which make creative thought and behavior more likely, are determined by a variety of sequelae, including that which is genetic, epigenetic, and environmental (Eysenck, 1993; Feist, 2010; Kandler, Riemann, Angleitner, Spinath, Borkenau, & Penke, 2016). Heritability estimates

of creative personality are similar to other traits, falling between 27 and 36 percent. However, creative personality cannot be fully explained by the five-factor model (Kandler et al., 2016) or other similarly broad conceptualizations of personality (Martinsen, 2011). The same traits that confer creative potential tend to be similar across age groups (Feist, 2010), though there is evidence that their expression waxes and wanes based on life events and other changing environmental factors (Helson, 1999).

Personality traits, as constructs, cannot be directly observed, but can be inferred based on how people tend to think, feel, and act (Feist, 1999a). The study of personality has usually involved the examination of stable patterns concerning both behavioral consistency and individual differences (Feist, 1999a). Behavioral consistency is the extent to which individuals act in a similar fashion across time and different contexts, while individual differences are the extent to which traits vary from person to person. As noted, the stability of trait-related behavior across different contexts has been called into question, and a strong case has been made for within-person variability of trait expression that is sometimes contingent on contextual variables (Jayawickreme, Zachry, & Fleeson, 2019; Judge & Zapata, 2015; Madrid & Patterson, 2016; Tett & Burnett, 2003; Tett & Gutterman, 2000). This is supported by other research that has indicated that though there is rank-order stability in personality, individuals will respond differently to trait measures when asked to consider different life domains (Lievans, Lang, De Fruyt, Corstjens, Van de Vijver, & Bledow, 2018). Trait expression will fluctuate, in part, as a result of sensitivity to environmental demands, an individual’s goals in a given context, and the extent to which a trait is cued by an environment (Fleeson, 2007; Tett & Burnett, 2003). The extent of this variability is also correlated with self-rated functional flexibility, which reflects an individual's ability and desire to adapt his or her behavior to meet situation-specific requirements (Lievans et

al., 2018), as well as with the extent to which individuals act in accordance with what they perceive to be their true selves (Sheldon, Ryan, Rawsthorne, & Illardi, 1997).

Creative personality has been conceptualized as a combination of cognitive, motivational-affective, social, and clinical traits that have physiological underpinnings and are also influenced by environments in both stable and dynamic ways (Benedek, Jauk, Sommer, Arendasy, & Neubauer, 2014; Feist, 2010; Khalil, Godde, & Karim, 2019). Cognitive traits reflective of creative personality, including openness to experience, are those which relate to information processing, problem-solving, and responding to new situations. Social traits reflect dispositions toward interacting with and viewing other people. Motivational-affective traits reflect an individual's trait-level desire to persist and be successful in activities. Clinical personality traits, or trait constellations, are those that are related to creative ability or behavior and can also be representative of mental health, such as psychoticism or hypomania (Feist, 2010). Various traits and clusters of traits have indeed been consistently related to creative personality, including openness to experience (Furnham, 2017), those that can be categorized under the broader heading of non-conformity, such as non-adherence to norms, independence of judgement, and a desire to break boundaries (Helson, Roberts, & Agronick, 1995; Collins & Amabile, 1999), and the tendency to think originally and fluently and make remote connections between seemingly disparate ideas (Lubart et al., 2013). Barron and Harrington (1981) noted important characteristics such as "high valuation of esthetic qualities in experiences, broad interests, attraction to complexity, high energy, independence of judgement, autonomy, intuition, ability to resolve antinomies or to accommodate apparently opposite or conflicting traits in one's self-concept, and...a firm sense of one's self as creative" (p. 453).

There have also been a number of domain-specific investigations, indicating both traits that benefit creativity across domains and those that have been proposed to be more domain-specific in their benefit or presence. For example, MacKinnon (1965) found that creative architects scored highly on scales of autonomy, psychological mindedness, flexibility, and femininity. Feist (1998, 1999a) determined that highly creative artists were characterized by openness to fantasy, experience, and imagination, impulsivity and a lack of conscientiousness, anxiety, affective illness, and emotional sensitivity, drive and ambition, and norm-doubting, non-conformity, independence, hostility, aloofness, unfriendliness, a lack of warmth, and introversion. Creative scientists, on the other hand, were characterized by openness to experience, flexibility of thought, drive, ambition, achievement, dominance, aggression, hostility, confidence, autonomy, introversion, and independence. Job-roles in some domains, such as laboratory science, may necessitate more emotional stability, and individuals who are more skilled in convergent thinking may gravitate toward creativity in the sciences more so than the arts (Getzels and Jackson, 1962; Simonton, 2017). Barbara Kerr and colleagues (e.g., Kerr & McKay, 2010; Kerr & Vuyk, 2013) have similarly found that some groups of creative students shared many of the more stereotypical creative personality traits already highlighted, while others did not. For example, creative helpers were higher in agreeableness and conscientiousness and lower in dominance and aggression, and they thought carefully before acting. Creative inventors were also conscientious and made careful plans but were less likely to be fantasy-prone or extraverted. Research such as this brings to attention the need to consider different trait-based paths to creativity when developing measures of creative potential.

In fact, there have been many suggestions that *paradoxical* trait pairs are of the most benefit to creativity. Barron (1957; 1963) asserted that creative individuals may be high on both

ends of what are usually considered bipolar spectra; they may alternate between naivete and knowledge, primary processes and logic, primitivism and cultural refinement, a proclivity to be constructive and destructive, and may also experience both more and less psychological and emotional adjustment than the average person. More socially desirable traits have, traditionally, been less accounted for in creative personality measures. This may be because some of these traits have more inconsistent overall relationships with creative behavior or success (Feist, 1998), or because capacities for divergence are probably more important to originality than those associated with convergence or conformity (Acar & Runco, 2015). Still Cropley (2006), Csikszentmihalyi (1996), and Westby and Dawson (1995) also argued for the consideration of such complexity in terms of trait-patterns of creative individuals. Supporting these arguments, Fürst & Lubart (2017) reviewed a number of apparently paradoxical relationships between higher order personality factors, lower order facets, and creative behavior. They proposed two overarching categories for their findings: rational and chaotic. Rational traits enable actions often found in later stages of creative processes (e.g., elaboration), while chaotic traits relate to success in earlier stages, such as divergence and thinking based in loose, automatic processing. They further specified that the dimensions are present across constructs related to affect, cognition, personality, cognitive styles, self-monitoring, processing depth, and motivation.

Traits have often been conceptualized as distinct from interests and abilities (Costa & McCrae, 1995), but interest and ability may still matter when conceptualizing creative individuals and creative potential (Davis, Keegan, & Gruber, 2012). Having certain knowledge, skills, interests, or abilities can confer benefit to creativity, especially when an individual learns to apply these in ways that allow for identifying gaps and problems, developing unique understandings, using multiple perspectives to problem-solve, re-organizing problem elements,

avoiding functional fixedness, and integrating tacit or explicit knowledge in the structing or solving of new problems, whether generally or in specific domains (Cropley, 2006; Jay & Perkins, 1997; Mumford, & Gustafson, 1988; Runco & Chand, 1995). Torrance (1979) devoted a book to the abilities he identified as being important to creativity; these will probably be reminiscent of traits already discussed. Among these abilities were being able to identify the essence of problems, being able to produce many ideas and consider alternatives, being original and breaking away from habits in thinking, being able to integrate seemingly incompatible components of ideas, having emotional awareness and expressing emotions and passion or interest, viewing familiar things in a new light, asking big questions, understanding the larger picture, seeking to understand connections between concepts, being able to imagine new possibilities and enjoying thinking in a fantastical manner, using humor and playfulness, and glimpsing infinity, or being existentially sensitive and open to all that is possible both in the present and future. In addition to interests and abilities, problem-solving approaches, cognitive styles, attitudes, and creativity-supportive lifestyle choices are probably also relevant to conceptualizations of creative potential (Acar & Runco, 2014; 2015; Basadur and Basadur, 2011; Cattani & Ferriani, 2008; Davis, 1999; Ivcevic & Mayer, 2009; Jay & Perkins, 1997; Kirton, 1976; Runco & Pina, 2013; Sternberg, Kaufman, & Roberts, 2019), though again there may be some debate as to the extent these things are reflective of enduring dispositions.

Looking more explicitly at potential for creative achievement, Runco et al. (1998) surveyed creativity researchers on their implicit theories of what was most important. Though this work did not focus on validating a measure or offering a taxonomy, the areas about which they inquired are informative and relevant. These included motivation (e.g., joy in work, perseverance), problem-finding/questioning (e.g., questioning assumptions, alert to novelty),

adaptive cognition (e.g., originality, imagination), risk-taking (e.g., adventurousness, assertiveness), knowledge (e.g., builds new structures, alert to gaps in knowledge), adaptive personality (e.g., curiosity, alertness), conventional cognition (e.g., clever, skilled decision-maker), and independence (e.g., questions conventions, individualism). Sternberg and Lubart (1991, 1992, 1993, 1995) have proposed a formal theory of resources contributing to creativity, which separates personality from motivation, intelligence, knowledge, intellectual styles, and environment. Lubart et al. (2013) also suggested several resources to be assessed in terms of creative potential: divergent thinking, analytical thinking, mental flexibility, associative thinking, selective combination, tolerance for ambiguity, risk-taking, openness, intuitive thinking, and motivation to create.

Trends in Measurement

Typically, studies of creativity have fallen under one or more of four overarching areas; the creative person, creative products, environmental influences on creativity, or creative processes (Rhodes, 1961). Runco (2007) has suggested the inclusion of potential as an additional focus. There are presently a number of instruments to measure creativity-specific constructs within each area, each targeting "distinct aspects of the phenomena," but no clear taxonomy of accepted measures in the field exists (Barbot, Hass, Reiter-Palmon, 2019, p. 234). Kaufman (2019), in fact, pointed out that many creativity measures are not used in more than a handful of studies.

By default, all measures of creative personality, are, to some extent, also measures of creative potential and are sometimes treated as such. However, careful consideration of measure instructions, item wording, and response anchors for measures that specifically target creative potential is probably more important than it seems. For example, some personality measures

inquire about the frequency of given behaviors or about endorsement traits like ambition, persistence, or motivation. Although behavioral consistency and having a propensity to actually do something no doubt reflects a greater likelihood of having *actualized* creative potential, having potential is not the same as having expressed it, consistently or not (Eysenck, 1993; Puryear, Kettler, & Rinn; 2017; Runco, 2004, 2007, 2015; Torrance, 2000; von Stumm, Chung, & Furnham, 2011; Zhang & Sternberg, 2011). Runco (2014; 2015) has noted that persistence and productivity are not essential to creativity, though they may help with its social recognition. It is important to note here that creative behavior need not result in socially recognized products but can instead involve new ideas and interpretations that may not be expressed in a traditional sense, and may, in fact, only be personally meaningful to the individual who has developed them. To design a measure of creative *potential* that is equitable and not biased toward behavior, success, achievement, or the ability to overcome intrapersonal or environmental barriers, these points should be kept in mind for all aspects of measure development.

Creative personality seems to have been measured most frequently by the use of an adjective checklist approach. Such self-report assessments are meant to ascertain self-views which reflect personality by asking participants to indicate whether various adjectives describe them. Gough's (1979) Creative Personality Scale (CPS) appears to be the most commonly used trait measure in research at present. Participants are tasked to select which of 30 adjectives apply to them; response options are dichotomous, and points are subtracted from scores for endorsements of contraindicative items. Davis (1975; Davis & Subkoviak, 1975) constructed another measure of creative potential called How Do You Think? (HDYT), with 102 items rated on a five-point Likert scale. This measure treats potential as a composite of motivations, behaviors, attitudes, and affective responses. Activities in several domains of creative behavior

are also queried. The twelve-item Self Report of Creative Traits (SRCT; Runco, Acar, & Cayirdag, 2017) is a trait measure that was developed from the HDYT and does not include items that query behavior in specific domains. For the SRCT, respondents are asked to indicate how often or to what extent they are flexible, habitual, original, spontaneous, typical, creative, a non-conformist, unoriginal, authentic, mindful, conventional, and different, on a five-point Likert scale. Items which do not reflect a creative personality are reverse-scored. The Creative Person Profile (CPP; Martinsen, 2011) is a trait-measure consisting of 216 items (Martinsen, Arnulf, Furnham, Lang Re, 2019), and focuses partly on ambition (e.g., need for achievement, persistence) and motivation (e.g., need for recognition).

A limitation of early creative personality measures is that development often focused on samples of individuals who had already displayed a high degree of creative ability and received social recognition for their creative pursuits (Helson, 1996). Research also tended to focus on samples of men, with Barron (1957) having proposed that "it is noteworthy that as an historical fact intellectual creativity has been conspicuously lacking in women, whose products are their children" (p.737). Later research elucidated that rather than suffering from a lack of creative potential, women may be subject to different social pressures, stereotypes, and judgements in regard to being perceived as creative or expressing creative behavior, even if such behavior is similar in character or quality to that of men (Foss, Woll, & Moilanen, 2013; Proudfoot, Kay, & Koval, 2015; Lebuda & Karwowski, 2013). Neurological research on creative performance has indicated the men and women perform similarly in terms of originality and fluency, though there may be some differences in the pattern of brain activation and problem-approach between men and women while completing creative tasks (Abraham, 2016). Among these were that men tended to engage brain regions associated with rule learning, while women had greater activation

in areas associated with social perception. This may have implications for measurement, both in terms of construct coverage and consideration of sample composition. Similarly, conceptualizations of creative personality in general have been criticized for being towards traits that are more likely to be encouraged in men (Proudfoot et al., 2015). A recent study has also suggested that the CPS may be biased in several ways, both psychometrically and in terms of failing to accurately reflect individuals who may be creative through the mobilization of different capacities (Luescher, Barthelmess, Kim, Richter, & Mittag, 2019). For example, individuals in some Asian cultures may be more prone to exercising creativity through socially conscientious means, which again seems to imply the importance of estimating individuals' potential for incremental creativity or interpersonal sensitivity and not just capacities for more pronounced originality or non-conformity in measures of trait-based creative potential. Again, in the spirit of equity, such limitations should be considered, and items that reflect potential to be creative in different ways and for different groups utilized.

The dichotomous scoring of the CPS may also present some issues, given that there is ample support for the conceptualization of personality as dimensional and continuous as opposed to categorical and binary (e.g., Kotov et al., 2017), and because there are psychometric limitations when dichotomously scored personality items are used (Simms, Zelazny, Williams, & Bernstein, 2019). *Reverse-scored* items may not adequately account for the complexity of personality discussed by Csikszentmihalyi (1996) and others. There are also practical considerations. Many of the readily available scales for measuring creative personality are either quite short or long. Shorter scales can decrease cognitive demand but suffer from a restriction in variance in samples where individuals are high on the construct (Meade, 2010). It is possible that this could be an issue, for example, if employees in unambiguously creative organizations are

surveyed. Long scales can provide nuanced information and increased reliability but may be perceived as burdensome and result in poorer data quality and higher levels of attrition, especially if multiple measures are used in a given survey (Galesic & Bosnjak, 2009; Hugick & Best, 2008).

Goals, Considerations, and Measure Development

In light of the research reviewed and additional research which will be discussed, there were several goals in regard to the development of the CP-PC that are summarized here:

1. To develop a measure not overly focused on expressed behavior or behavioral consistency.
2. To leave out traits explicitly reflective of persistence, ambition, energy, or *level* of motivation (*quality* of motivation, such as curiosity, or an interest in the unfamiliar, is a different story); difficulty in any one of these areas could quite clearly be explanations for a lack of actualization of potential, and thus may confound attempts to measure it.
3. To structure the measure so that it would be as free of context effects as possible, given findings specific to environmental influences on trait expression.
4. To develop the measure in such a way as to not reinforce domain-specific biases in perceptions of creativity and creative individuals (e.g., an arts bias; Patston, Cropley, Marrone, & Kaufman, 2018). With this goal in mind, the CP-PC was designed to include more domain-general propensities while also having wide domain coverage (e.g., inclusion of items that may be reflective of potential for interpersonal creativity), with items focused on capacities that have been associated with a range of types of creative expression or approaches to creativity,

or that likely indicate the potential to develop in any area where interest, skill, or ability are present (e.g., capacity for original thought). This is not to say that general traits always manifest across all domains of creative behavior within a given individual (a position criticized by Kaufman & Baer, 2004), but that they provide raw material that can be developed and are relevant to a number of domains, given more specific skills, interests, opportunities, positive encounters with specific domains, etc.

5. To avoid traits indicative of negative emotion or affective instability unless items could be framed in such a way as to imply sensitivity, but not what one does with it, how well it is handled, or whether that sensitivity would only logically result in distress or instability. In spite of findings on traits of creative artists, for example, Richards (1990) and others have pointed out that although disequilibria can be good for creativity (e.g., Runco, 1994), too much dysregulation may impede it (Akiskal et al., 1998; Acar, Chen, & Cayirdag, 2018). In fact, multiple Axis I diagnoses are characterized by either low motivation or other forms of behavioral inhibition and associated distress and impairment (American Psychiatric Association, 2013), which returns us to the motivation issue. Further supporting the need for careful consideration, Baas, Nijstad, Boot, & De Dreu (2016) found that vulnerability to mental health disorders characterized by higher approach motivation positively predicted creativity variables, and those characterized by avoidant behavior or disengagement (e.g., anhedonia) did not.
6. To address potential issues with previous measures of creative personality and potential and to supplement gaps in existing measurement instruments, as

discussed in the preceding section. This includes accounting for paradoxical traits and those that may confer potential for creativity in ways that are not as frequently accounted for by trait measures at present, as well as creating a measure somewhere in the middle of existing commonly used instruments in terms of item number.

Item and Measure Development

Potential represents the range of propensity for creative thought or behavior, that is to some degree unexpressed and may be possible to cultivate (Runco, 2007). In regard to the CP-PC, creative potential is also conceptualized as being comprised of traits (or constructs that can likely be trait-like in quality) that have been associated with any number of ways to think or behave creatively. These traits can be expressed at any level of personal or social success, recognition, or meaningfulness, related to one or more of the following areas: traditional conceptualizations of traits, cognitive, social, affective processes or styles, or creativity-supportive attitudes, interests, skills, abilities, or problem-approaches. The traits may or may not be expressed in the form or service of actual creative behavior or may be expressed to varying degrees for any given individual.

An extensive and broad literature review, focused on the areas listed above, was conducted to aid in item development. In the interest of article length, specific constructs are not discussed further here, but additional information is available from the author upon request. Examples of the literature reviewed and constructs targeted are provided with the measure items in Table 4.1. Creativity-related constructs were considered based on the presence of consistent or especially notable findings in the research literature, whether they were also supported by recent research, whether constructs had the potential to contribute something new and useful to a

measure of creative personality/potential, and the extent to which they aligned with the goals of measure development. In addition to the research literature several personality, self-concept, cognitive, and attitudinal measures specific to creativity or its correlates (e.g. openness to experience) were reviewed during the item development phase so that a better understanding of current measurement tools and possible strengths and gaps could be gained. The Runco Ideational Behavior Scale (RIBS; Runco, Plucker, & Lim, 2001) and Self Report of Creative Traits (Runco, Acar, & Cayirdag, 2017) were used to guide item development, with a few items being used or adapted (with different instructions and scale anchors) from these with the permission of the first author, since these instruments have been found to be reliable and valid in past research and are directly relevant to estimating trait-based creative potential.

From the review, an item pool was developed and subsequently narrowed down based on discussions with individuals in the field of creativity research. A major goal in item construction and selection, given the desire to create a mid-range measure in terms of item number, was to cover as many relevant constructs as possible without having an overwhelming number of items, and to also cover both cognitive and non-cognitive aspects of constructs when possible. Although not necessarily ideal, to keep the number of items low and coverage high, this was sometimes done within the same question. Instructions for the CP-PC direct participants to consider their truest selves (see Appendix 4A for the full measure), even if they do not always behave in a manner that is consistent with a CP-PC item. In theory, this should allow, for example, individuals who are in daily environments that discourage creativity to experience less ambiguity about the response to choose. The item format for the CP-PC is analogous to that of the SRCT; a descriptor is provided in bold, with a brief explanation following. Six scale anchors were chosen (*exactly like me - not at all like me*), as internal consistency reliability tends to

increase up to this point (Simms et al., 2019). Scale mid-points (e.g., neutral, neither agree nor disagree) are not included for the CP-PC, as mixed-methods research has indicated that midpoint responses are less likely to reflect individual variation on a construct than they are to reflect that the target of the item varies across contexts (Kulas & Stachowski, 2013).

Pilot Test of the CP-PC

An online pilot study using a 23-item CP-PC was conducted with a sample of 53 (46 female) undergraduate students from a large Southeastern University in the United States. Participant age ranged from 18 to 24 (M = 19.6, SD = 1.2). In this study, the CP-PC had a Cronbach's alpha value of .77 and was moderately to strongly related to ideational behavior (r = .69, $p < .001$), two indices of openness to experience (rs = .52, .65, $ps < .001$), and a total creative activity and accomplishments composite score based on 20 items covering four domains of creative behavior (r = .55; $p < .001$). Because trait-openness to experience has been found to be a robust personality-specific predictor of a range of creativity-specific variables (Puryear, Kettler, & Rinn, 2017), it was an acceptable measure of convergent validity. The measures of ideational behavior and creative activities were utilized to investigate criterion-related validity. Ideational behavior reflects creative potential specific to ideation, while real-world creative behavior reflects creative potential that has been expressed via some observable activity. Because ideational behavior and the CP-PC both reflect creative potential, because items to measure ideational behavior were used to develop the CP-PC items, and since the measure of ideational behavior was modified to reflect dispositional ideational behavior (see Measures section), the CP-PC was expected to have a stronger relationship with and thus, better predictive ability for ideational behavior than expressed creative behavior. CP-PC scores did predict ideational behavior above both openness to experience indices, but only showed incremental

predictive validity for creative activities and accomplishments above and beyond one of them (the 10-item HEXACO scale of openness to experience; Lee & Ashton, 2018). An exploratory factor analysis indicated eight factors with eigenvalues greater than one, as well as some possible preliminary item sets. However, the models showed some instability and inconsistent factor loadings for a number of models/items, possibly due to the small sample size; some items moved from factor to factor or loaded on their own factor depending on how the data were modeled. As such, these items were reviewed to identify potential issues (e.g., whether the wording might be confusing), and several were revised. Additional items were added to the CP-PC after the pilot, on the basis that they might form more stable factors with the piloted items. The revised measure, including the additional items, can be viewed in Appendix 4A. More detailed information regarding the initial items and pilot study design and results is available from the author upon request.

Method

The purpose of the present study was to better understand the psychometric properties of the CP-PC, in other words, determining the extent to which it is a reliable measure and a valid indicator of creative potential. First, a number of descriptive statistics were examined. To investigate dimensionality, the factor structure of the measure was further explored, as were corrected item-total correlations and the correlation of the CP-PC sum score with other variables. Ideational behavior and creative activity and accomplishment were again used to investigate criterion-related validity. An index of openness to experience (please see the Measures section) from the pilot was also used in this study, both as an indicator of construct validity and as a control variable in multiple regressions predicting ideational behavior and creative activity and accomplishment. Two additional variables were examined: creative self-concept (comprised of

creative personal identity [CPI] and creative self-efficacy [CSE]) and trait neuroticism. CPI indicates the extent to which creativity is a valued part of one's identity, while CSE indicates an individual's confidence in his or her ability to be creative (Karwowski & Lebuda, & Wiśniewska, 2018). The CPI subscale was used as an additional indicator of criterion-related validity. The measure of trait neuroticism was used to explore the discriminant validity of the CP-PC, in comparison to trait openness to experience; past research indicates that creative personality should be less strongly related to neuroticism than to openness (Taylor, McKay, & Kaufman, 2017). Finally, based on the outcomes of the planned analyses, additional exploratory analyses were conducted and are described in the Results section.

Sample

Participants were recruited to the study through the online Amazon Mechanical Turk (MTurk) platform. The entrance criteria were that individuals were 18 years of age or older, located in the United States, and fluent in English. Fifteen individuals began the survey without completing it and were excluded from analyses, for an initial sample of 400 participants. Of those 400, others were excluded for failing an attention check (meant to identify participants who responded to survey items at random; $n = 1$), providing an illogical answer to an item meant to screen for bots (i.e. an automated program and not a human respondent; $n = 1$), or spending an unreasonably short amount of time on survey completion (fewer than 343 seconds, or more than one standard deviation below mean completion time; $n = 30$), for a final sample of 368 participants (198 female, 169 male, 1 prefer not to answer). These participants were included in all subsequent analyses, with two exceptions: the participant who did not indicate their sex was not included in the analysis using that variable and an individual who listed the year they were

born and not their age was not included in the analysis involving that variable. There were no other missing data.

The age of participants ranged from 23 to 75 (M = 42.19, SD = 11.78). Two-hundred ninety-eight (81%) participants identified as White, 34 (9.2%) as Black or African American, 13 (3.5%) as Asian, 10 (2.7%) as being of Hispanic, Latino/a, or Spanish Origin, 7 (1.9%) as a member of more than one group listed, 2 (.5%) as Native Hawaiian or Other Pacific Islander, 2 (.5%) as Middle Eastern or North African, 1 (.3%) as part of a group not listed, and 1 (.3%) preferred not to answer. Seventy-three (19.8%) participants had completed some high school, high school, or a technical certification, 254 (69%) some college, an associate's degree, or a bachelor's degree, and 41 (11.1%) had completed a graduate-level degree.

Measures

Runco Ideational Behavior Scale (RIBS; Runco et al., 2001). The RIBS is a commonly used 23-item measure that provides an alternative to traditional product- or activity-based assessments of creative behavior and has evidenced sufficient reliability and validity. Instead, it focuses on ideation as a creative product (e.g., "I have always been an active thinker—I have lots of ideas"). In the present study, scale instructions and response options were modified to be analogous to the CP-PC, to decrease cognitive demand on participants and to allow for the inclusion of a measure that would be comparable in all but actual item content. Such an approach can help to identify issues with measure construction upon examining correlations between a new measure and those with similar and different structures (Bandalos, 2018).

Big-Five Aspects Openness and Intellect Scales (BFAS; DeYoung, Quilty, & Peterson, 2007). This 20-item scale was created to represent two *aspects* of openness to experience and so has two subscales: openness and intellect. The openness and intellect scales

have been found to be internally consistent and valid in that they differentially predict creative achievement in arts and sciences above and beyond other personality traits, with openness most related to the arts and intellect most related to the sciences (Kaufman et al., 2016). Response options for the BFAS scales are presented on a 5-point Likert scale (*very inaccurate - very accurate*). Sample items include "I formulate ideas clearly" and "I see beauty in things that others might not notice". Eight items are reverse-scored. Scores for the openness and intellect aspects were calculated, as was a total score.

Creative Activity and Accomplishment Checklist. Creative Activity and Accomplishment Checklists present a way to address the *criterion problem* in creativity research (Paek & Runco, 2017). The version of the CAAC used for the present study was derived from that used by Shepard et al., (2019), which includes 106 items to examine creative activities and accomplishments outside of work and school. To create a shorter version from this item pool, six items with strong inter-item correlations from six domains (everyday creativity-crafts, everyday creativity-problem-solving, everyday creativity-play and exploration, writing and language, music and visual arts, and math and science) from the Shepard et al. (2019) study were selected. A three-item quality scale, inquiring about social recognition of creative activities and accomplishments, was also included. In total, 39 items were used. On the CAAC, respondents are asked to indicate how often they have engaged in creative activities (e.g., "Written a story, book, or play") and response anchors are on a 0 to 3 scale (*never, once or twice, three-five times, five or more times*). Participants were asked to only indicate creative activities that they engaged in outside of formal work or educational settings to provide an estimate of creativity that was more likely to be self-initiated. A total CAAC score was calculated, as was a total everyday

creativity score (by adding the three everyday domain scores). Domain scores for each of the six domains and the quality scale were calculated by summing scores for the scale-specific items.

Short Scale of Creative Self (SSCS; Karwowski & Lebuda, & Wiśniewska, 2018). The SSCS is an 11-item measure of two creativity self-concept constructs; creative personal identity (CPI; five items) and creative self-efficacy (CSE; six items). Past research indicates acceptable psychometric properties of the measure, and that CSE and CPI are positively correlated with seeking new experiences, comfort with uncertainty, openness to experience, self-rated originality, and divergent thinking (Karwowski, 2012; Karwowski, Lebuda, Wiśniewska, & Gralewski, 2013; Karwowski & Lebuda, 2018). Sample items are: *My creativity is important to who I am* and *I am sure I can deal with problems requiring creative thinking*. Response options are presented on a five-point Likert-scale (*definitely not-definitely yes*). A total score and scores for each of the two scales were calculated.

Neuroticism Scale of the IPIP-NEO-60 (Maples-Keller, Williamson, Sleep, Carter, Campbell, & Miller, 2019). The IPIP-NEO-60 was developed by applying item response theory to 300 items from the International Personality Item Pool that represent the five-factor model conceptualization of personality, and evidenced acceptable reliability and validity. The neuroticism scale consists of 12 items and measures trait propensity for negative affect. It has six facets: anxiety, anger, depression, self-consciousness, immoderation, and vulnerability. Four items are reverse-scored. Because instructions and response anchors for this scale and the BFAS items are similar, the BFAS instructions and response anchors were used for this scale to minimize cognitive load on participants. IPIP items are explicitly designed to be used in this way (Goldberg et al., 2006). A sample item is *I often feel blue*. For the present study, only the total score for the scale was used.

Procedures

Data were collected online using the TurkPrime platform, and participants were recruited via MTurk. Participants read a short description of the survey prior to deciding whether to participate and were paid 2.25 USD for completion of the survey. Participants viewed study materials in the following order: consent form, demographic items, CP-PC, RIBS, BFAS, CAAC, SSCS, and the neuroticism scale of the IPIP-NEO-60. An attention-check, which asked participants to select the response "Neither Accurate nor Inaccurate" for the item, was included at the end of the BFAS, and a "human-check" that included text entry was included after the consent form. This was due to concerns about bots on MTurk around the time that the data were collected.

Results

Data were checked to determine that regression analyses were appropriate, as well as examined for outliers and data points that might exert undue leverage. Univariate and multivariate outliers were identified, so analyses were conducted with and without these cases. There were not large differences in standardized correlation coefficients, so data from all 368 participants were retained. Skewness and kurtosis values ranged from -.96 (creative self-efficacy) to 1.45 (creative behavior in math and science) and -.1.15 (social recognition for creative behavior) to 2.02 (creative behavior in math and science), indicating sufficiently normal distributions based on the sample size (Kim, 2013). A visual inspection of the distribution of CP-PC scores indicated that there were relatively fewer scores in the lower range, though the shape of the distribution appeared otherwise normal. Cronbach's alpha values for measures were acceptable (see Table 4.2), and corrected item-total correlations for the CP-PC fell between .32 (different) and .76 (full of ideas), indicating sufficient shared variance between items.

Planned Regression Analyses

Bivariate correlations were calculated and can be viewed in Table 4.3 (this table includes correlations between variables a shortened version of the CP-PC, which will be discussed below). The CP-PC showed the strongest relationships with ideational behavior (r = .80, p < .001) and the BFAS total score (r = .80, p < .001), followed closely by the SSCS total score (r = .79, p < .001). The Pearson correlation between the CP-PC and sex (women, M = 193.12, SD = 31.82; men, M = 191.62, SD = 33.88) was small and not statistically significant (r = .02, p = .66), as was the case with the bivariate correlation between the CP-PC and age (r = -.10, p = .29).

Hierarchical multiple regressions with the two BFAS openness aspects and the CP-PC scores as predictors and ideational behavior, the total score for creative activity and accomplishment, and creative personal identity as dependent variables were conducted (see Table 4.4) Tolerance and VIF statistics for the predictors in the model indicated that multicollinearity was not of concern. The CP-PC predicted ideational behavior (as indicated by scores on the RIBS) above and beyond the two BFAS openness indices (openness and intellect) in Step 2 of the regression (F(3, 364) = 221.49, p < .001, R^2 = .65), accounting for an additional 16.8% of variance in RIBS scores. CP-PC scores also predicted both total CAAC (F(3, 364) = 68.87, p < .001, R^2 = .36) and CPI scores (F(3, 364) = 203.55, p < .001, R^2 = .63) above and beyond openness and intellect, accounting for an additional 5.2 and 6.1% variance in the CAAC and CPI scores, respectively.

Exploratory Factor Analysis

An exploratory factor analysis was conducted, using a maximum likelihood extraction method. The initial, unrotated model had eight factors with eigenvalues greater than one, explaining 54.64% of the variance after extraction. The unrotated eight factor matrix indicated

that all items loaded on the first factor at values that ranged from .33-.80; some also displayed loadings at .3 or above on additional factors. Based on the pilot results, six, seven, eight, and nine factor models with oblique rotations were then tested. An eight-factor model with a promax rotation showed loadings that were most consistent with past theoretical papers, empirical research, and logic; this solution was also the clearest to interpret based on the pattern matrix. The Kaiser-Meyer-Olkin (KMO) Test of Sampling Adequacy value for the data was .95. and Barlett's Test of Sphericity was significant ($\chi^2(903) = 9303.24$, $p < .001$), as was the overall significance test for the eight-factor model fit (χ^2 (587) = 1187.21, $p < .001$). This second significance test may indicate that extracting more factors would result in a better model fit. However, extracting additional factors did not improve model interpretability and so the eight-factor rotated model was retained. Upon extraction, item communalities ranged from .28 (childlike) to .82 (imaginative), indicating that each item shared between approximately 8 and 67% of its variance with the extracted factors.

Factor loadings from the pattern matrix of the rotated solution, which represent the *unique* variance shared between an item and the given factor (Price, 2017), were clear for most items (see Table 4.5). When item-loadings were unclear, or an item could have fit better on another factor theoretically, the structure matrix was also considered. Unlike the pattern matrix, the structure matrix takes into account the shared variance between factors (see Table 4.6 for correlations between factors). Ultimately, few adjustments were made on this basis. The structure matrix did indicate that when the correlation between factors was considered, most items had loadings above .3 on many of the factors. Lastly, items belonging to each of the eight factors were reanalyzed in eight separate EFA models using maximum likelihood extraction, which indicated that the items for each dimension formed just one factor.

Based on the review of the literature for measure development, titles were assigned to each factor. For the most part, factors were named for concepts that have been discussed throughout the creativity literature that represent the common themes across factor items. Factor 1, *awareness* is comprised of items that reflect both self-awareness (e.g., evolving, authentic) and awareness of problems and concepts (e.g., integrative, a noticer). Factor 2, *novelty* is reflective of a sensitivity to and desire for trying new things (e.g., explorer, adventurous), as well as a tendency toward or preference for unconventionality (e.g., boundary-breaking, unconventional). Factor 3, *complexity*, reflects paradoxical traits (e.g., complex, multifaceted) and a tendency to think or behave in a complex manner (e.g., childlike, a divergent thinker). The items that form Factor 4, *sensitivity*, reflect a tendency to be sensitive to noticing or engaging with internal and external stimuli (e.g., empathetic, passionate). Factor 5, *non-conformity*, is reflective of a tendency to feel, think, or act differently than others (e.g., different, fluid). Factor 6, *independence*, is characterized by the preference to make up one's own mind and make choices in a manner that is self-directed (e.g., accepting, autonomous). Factor 7, *flexibility*, is comprised of items that reflect curiosity about or interest in about a wide variety of topics (i.e. curious, interested) and a similar adaptability in regard to thinking or behavior (i.e. open, adaptive). Factor 8, *fluency*, reflects the tendency to have many ideas or sources of inspiration (i.e. imaginative, inspired, full of ideas). The descriptor 'creativity' is also part of this dimension. Given the items that are part of this factor and the unique correlation of the factor with almost all of the outcome variables of interest (reviewed below), this factor may be best conceptualized as a sort of 'core creativity' factor. The descriptive statistics for the factors are presented in Table 4.7, and the zero-order correlations of the factors with the other study variables in Table 4.8.

Creating a Short Version of the CP-PC

All of the 43 items tested for the CP-PC were retained, given that corrected item-total correlations were acceptable and factor loadings, as indicated by the structure matrix, were sufficient. Given the goal to develop a relatively short measure with wide coverage, a shorter version of the CP-PC was also created for ease of use. This short version (CP-PCs) was constructed based on a review of item means, corrected item-total correlations, and factor loadings. Given several relatively high means for the CP-PC items and the desire to create a short scale with a good amount of variance, both items that loaded or correlated well with the factors and overall measure, respectively, and items that had low mean values and thus would be likely to provide some ability to discriminate amongst high scorers were included. Correlations between several potential short versions of the measure and the total score of the unused items were calculated and residual plots examined to identify whether scores on the short version of the measure unexpectedly diverged from participants' scores on the remaining items. The bivariate correlation between the final 28-item short version and the remaining CP-PC items was .91 ($p < .001$). The Cronbach's alpha value for the short version was .95, with corrected item-total correlations ranging from .36 (sensitive) to .76 (full of ideas). Items that are included on the CP-PCs are indicated with asterisks in Appendix 4A.

Unplanned Analyses

Given the emergence of a what appeared to be a tenable multi-dimensional factor solution, additional analyses using the eight dimensions from the rotated factor solution were conducted. A total score was calculated for each of the eight factors by adding raw scores for each of the items from the given factor. All CP-PC items were used. These analyses were conducted to further explore whether the use of multiple dimensions might provide useful

information compared to treating the measure solely as unidimensional. To this end, regression models with scores from the eight CP-PC dimensions entered simultaneously as independent variables and each of the other scales and subscales from the study entered as dependent variables were examined. This method provided an estimate of the shared variance between each dimension and the outcome variable, controlling for the other dimensions simultaneously. Semi-partial correlations were also calculated to identify the amount of *unique* variance shared between a given dimension and the specific outcome of interest. Collinearity values, reflected by the Tolerance and VIF statistics, again indicated that multiple regression was tenable. The regression analyses indicated that each outcome variable tended to have its own pattern of predictive dimensions when the other dimensions of the CP-PC were held constant. A summary in Table 4.9 highlights statistically significant results, while Table 4.10 provides more detailed information. In the interest of space, a textual listing of results is not provided, but these results are explored in the Discussion section.

Exploratory Moderation Analyses

Two final unplanned analyses were conducted; both explored moderation using the long form of the CP-PC as a predictor and the CAAC total score as the dependent variable; creative self-efficacy and neuroticism were used separately as moderators. These moderation analyses were conducted due to the moderate to strong relationships between the CP-PC and CSE (positive) and between the CP-PC neuroticism (negative); these variables make likely candidates for moderators of the potential-behavior relationship. Version 3.3 of the PROCESS macro for SPSS (as described in Hayes, 2013) was used for the analyses.

In the first moderation model, CP-PC and CSE scores, as well as the interaction term (CP-PC X CSE) were entered into the software as predictors, with the total CAAC score as the

outcome variable. 95% confidence intervals were constructed for regression coefficients using 5000 bootstrap simulations. Based on the guidance of Hayes (2013), unstandardized model coefficients are reported; see Table 4.11. The analysis indicated that the effect of trait-based creative potential on creative behavior is conditioned on creative self-efficacy, though the variance added by modeling the interaction in addition to the main effects was small (b = .01, p = .03, ΔR^2 = .01). The Johnson-Neyman Technique was applied to probe the interaction; this provided estimates of the conditional effect of trait-based creative potential on creative activities and accomplishments at each value of CSE. This demonstrated that the relationship between creative potential and creative behavior was contingent on CSE for individuals with scores of 12.11 or greater on the CSE measure; 94.29% of participants scored above this value.

Next, a visual representation of the effect at high, medium, and low levels of creative self-efficacy was examined (see Figure 4A). Because the use of pre-programmed cut-off scores (e.g., scores at the mean and 1 *SD* above and below) is often done arbitrarily (Hayes, 2013), more meaningful cut-offs were used to illustrate the moderated effect. Individuals who typically responded with 4s and 5s on the CSE measure (between 24 and 30 points) were placed in a high CSE group. Individuals with scores ranging from 13-23 points were considered moderate, and individuals who scored 12 points or below (indicating that their typical response to an item was *somewhat not* or *definitely not*) were considered low in CSE. Based on the results described above, the conditional effect of CP-PC X CSE on creative behavior is not statistically significant for this lowest group. Accordingly, there does not appear to be much of a difference in the regression line between high and moderate CSE groups; as creative potential increases, there is also an increase in creative behavior. However, for the low CSE group, the slope of the

regression line is far less pronounced, indicating only small increases in creative behavior across ascending levels of creative potential.

The same process was used to test for an interaction of trait-based creative potential and neuroticism on creative activity and accomplishment. In this case, the interaction between creative potential and neuroticism was not significant (B = -.00, p = .38, ΔR^2 = .00). Use of the Johnson-Neyman Technique indicated that creative potential was significantly related to creative behavior across all values of neuroticism. In the event of a non-significant interaction, testing a simultaneous regression model with only the two main effects is recommended (Hayes, 2013). The results of this test (F(2, 365) = 188.60, R^2 = .34, p < .001) indicated that neuroticism was not a significant predictor of creative behavior when controlling for trait-based creative potential (β = -.13, SE = .10, p = .169). The influence of trait-based creative potential on creative behavior was, however, significant (β = .56, SE = .03, p < .001).

Discussion

The analyses indicated sufficient internal consistency of the CP-PC, with a Cronbach's alpha value of .96 for the long form and .95 for the short form of the measure. Although the exploratory factor analyses and results of the subsequent simultaneous regressions make a preliminary case for multi-dimensionality, this does not mean that the measure cannot still have a high Cronbach's alpha value or be linearly related to other measures (Bandalos, 2018). In fact, given the number of moderate to strong intercorrelations between factors, the high alpha value may be indicative of a general factor underlying measure items (Cronbach, 1951; Revelle & Wilt, 2012). The emergence of eight theoretically relevant factors upon model rotation with acceptable communalities and factor loadings support conceptualization of the CP-PC as a measure with multiple, though largely interrelated, dimensions. The item sets for each

dimension, for the most part, showed acceptable alpha values, ranging from .68-.91, and additional exploratory analyses indicated that each dimension was comprised of a single factor. Still, because analyses were exploratory, future research should be conducted that is confirmatory in nature. Preliminarily, it does appear that the CP-PC could be used to calculate both a composite score (given the pattern of the sum-score correlations with related variables) and separate subscale scores, depending on the specific goals framing future studies or practical applications.

Relationships held across the pilot and main validation study for varied scales reflecting correlates of creativity or creativity-specific variables, indicating robustness for the CP-PC and its short form, the CP-PCs, in predicting variation in constructs that were expected to be related to creative potential. The CP-PC showed concurrent incremental predictive criterion-related validity for both ideational and creative behavior, as well as creative personal identity. The CP-PC also discriminated between openness to experience and neuroticism. The smaller relationship between the CP-PC and creativity in math and science, as well as its weaker relationship to creative behavior compared to its relationship with other measures, is consistent with other research in the field (e.g., Kaufman, Cole, & Baer, 2009). The use of multiple everyday creativity scales was informative; of the domains of creative behavior queried, the CP-PC showed the strongest relationship with everyday creativity - play and exploration.

The strong correlation of the CP-PC with creative self-efficacy was somewhat troubling from a psychometric stance, as the CP-PC is meant to also detect creative potential in those who do not feel efficacious about their creative ability. However, with 59% shared variance, there is still room to account for individuals who do not feel creatively efficacious. Accordingly, the exploratory moderation analysis indicated that for individuals low in creative self-efficacy, the

expression of potential in the form of creative behavior stayed relatively similar across values of trait-based creative potential. This appears to be consistent with the work of Karwowski and Beghetto (2018), who found conditional indirect effects for CSE on creative behavior, using several indicators of creative potential as independent variables. Mockros and Csikszentmihalyi (2014) asserted that "self-motivation and confidence are considered essential to the *development* of creativity and eminence (italics added)" (p. 132) and highlighted the role of individuals in social environments, such as teachers and colleagues, in cultivating efficacy. There are implications for those that wish to help others express their creative potentials here, though this is not to say CSE is the only issue at hand.

The relationships between the CP-PC dimensions and the other variables in the main study, while not hypothesized beforehand, are mostly reasonable (though future studies should be conducted to determine whether the results replicate). For example, that the dimension of novelty consistently significantly predicted multiple domains of creative behavior resonates with the work of Baas, Nijstad, Koen, Boot, & De Dreu, (2019), which found relationships between creative behavior, approach motivation, and novelty sensitivity. Complexity, non-conformity, and fluency's predictive ability of creative behavior in the domain of writing, and non-conformity and fluency's predictive ability of creativity in the domain of music and visual arts, seems to complement the findings of Feist (1998), in his exploration of traits associated with high creativity in the arts compared to the sciences. Consideration at the item-level for the complexity and non-conformity dimensions also brings to mind the work of Dudek, Bernèche, Bérubé, & Royer (1991), who found that the prototypical artist had a child-like free spirit and denied convention. One might have expected complexity to also stand out for those with higher scores in the musical and visual arts and for sensitivity or independence to also be predictive.

However, one will recall that the simultaneous regressions controlled for the other dimensions and that the zero-order correlations were positive. Independence, surprisingly, was negatively predictive of ideational behavior and the openness aspect of openness to experience when other dimensions were controlled for, but not positively predictive of any of the variables. It is possible that this might be different in regard to different outcomes; Kim and Hull's (2012) work on creative personality and prematurely leaving high school comes to mind, as does Gilson & Madjar's on creativity that is more radical or innovative in nature (2011). Fluency, which also appears to reflect a sort of core or perhaps face valid creativity dimension, with questions tapping creative self-perception, imagination, ideational fluency, and tendency toward inspiration and transformation of the familiar, was positively predictive of all measures and subscales in the simultaneous regressions, except for the intellect aspect of openness to experience and neuroticism. It is possible that as such, the four items from this dimension could be used as a broad and extra short measure of creative potential, pending further research with similar results.

Given the comparison of zero-order correlations for the dimensions of the CP-PC to the dimensions entered into simultaneous models, the importance of consideration of suppression effects is indicated. All zero-order correlations of the variables with the CP-PC and its dimensions were positive (save neuroticism), with most being statistically significant. However, when variance contributed by the other dimensions was held constant, relationships with at least one of the dimensions for each outcome became statistically non-significant, or, in other cases, statistically significant but negative (i.e. the sign of the effect reversed). These findings appear to support the theoretical exploration of Fürst & Lubart (2018) when they noted that conflicting results around personality traits and creativity-specific outcomes may in part be due to paradoxical relationships of components within higher order constructs in regard to creativity. In

fact, upon closer examination with the simultaneous regression models, neuroticism was *positively* predicted by complexity, though the zero-order correlation was negative and not statistically significant. Given the nature of the complexity items, it is possible that they may represent a sort of creativity-related mental health factor, at least for some individuals. Although the items were not designed to tap affective, social, or psychological distress, but to be neutral in this regard, the items could reasonably be seen to align with research on struggles with such, if a person has tended to experience them (see Smith & Alloy's [2009] review of the rumination literature, Davey and Meeton's [2016] summary of the literature on worry preservation, and Goth et al.'s [2012] discussion of self-concept integration and mental health, for example). In Martinsen's (2011) study, his complexity items loaded onto an affective instability factor, which lends support to this premise. If some of the relationships between creativity and mental health, disequilibria, etc. noted in the literature are driven by complexity more so than other domains of creative potential, fruitful directions might be revealed in terms of ways to support individuals in using such complexity as a strength. Finally, given the nature of the complexity items and the dimension's relationship with higher neuroticism and lower CSE, there are additional related research questions that could be examined empirically. Although there has been discussion in the literature about how paradoxical traits and fairly equivalent cognitive abilities (e.g., homospatial, Janusian, and dialectical thinking) may represent some sort of integration of opposites that is beneficial to creativity, it is possible that while being able to hold conflicting ideas or traits at once may indeed benefit creativity, the actual integration piece might not be happening for everyone. Given that there are entire therapeutic modalities devoted to helping individuals achieve such integration (and thus supporting the idea that integration in the face of being able to hold conflicting thoughts or traits is by no means guaranteed), further exploration of this premise

would be especially interesting. Based on the second exploratory moderation analysis, it at least does not appear that the expression of trait-based creative potential is unduly hindered by neuroticism, at least over time (as the CAAC instructions did not specify a timeframe).

There are limitations to the present investigation. First, the pilot utilized a modest-sized sample. Results were confirmed using a larger and more diverse sample, but determining whether the results replicate in additional studies is certainly warranted. Many exploratory analyses were conducted, but it is encouraging that most tests reached statistical significance at a level below $p = .001$. The studies were correlational and cross-sectional, so additional research should also be conducted using diverse designs. Common method bias, in the regard to the use of self-report measures, is also a potential limitation. However, with the exception of the RIBS, the other measures in the study did use different instructions, response scales, and numbers of scale points from the CP-PC, which lends some credibility to the results. Finally, there were relatively few scores in the lowest range of possible CP-PC scores, which should also be explored in future research.

There are other methods with which the psychometric properties of the CP-PC could be tested, including item response theory. It might also be useful to explore responses to CP-PC items with qualitative or mixed methods approaches, to better understand the extent to which it is measuring *unexpressed* creative potential. In the quantitative realm, constructs related to motivation or barriers to creativity could be tested a moderators or mediators of the CP-PC and creative behavior relationship. Longitudinal investigations, such as those conducted by Richards, Kinney, Benet, & Merzel (1988) might also yield important insight about the development and stability of the dimensions of the CP-PC over time. Additional types of creativity could be

explored in relation to the CP-PC and its dimensions, including emotional or political creativity. Finally, the CP-PC could be examined in relation to the other traits of the FFM.

In addition to use in research, the CP-PC may have practical uses. For example, similar to strengths assessments (e.g., Peterson & Seligman, 2004) it could be utilized as a tool to help individuals understand the areas in which they demonstrate the highest degree of creative potential. It could also be utilized to improve managers', instructors', or school administrators' knowledge about creative potential and how it might manifest in day to day life so that it can be better supported. Some positive aspects of the CP-PC thus far are that it appears to detect creative potential fairly unequivocally across gender and age, and that it does not require a manual to score or interpret, as can be the case with measures derived from adjective checklists or other personality batteries where what a high score on an item or constellation of items indicates is not readily apparent from the items or item clusters themselves. Additionally, item development was based on a close examination of decades of research, and the measure can provide information about a wide range of traits that confer creative potential without being prohibitively high in the number of items used. Finally, neither actual performance nor behavioral consistency are required for creative potential to be captured by the CP-PC. Although in some cases the lack of behavioral indicators would be a limitation, in others such an approach could be of great benefit to the identification of creative potentials that individuals have not or have only minimally expressed and may not even be aware they possess.

References

Abraham, A. (2016). Gender and creativity: An overview of psychological and neuroscientific literature. *Brain Imaging and Behavior, 10,* 609-618. https://doi.org/10.1007/s11682-015-9410-8

Acar, S., Chen, X., & Cayirdag, N. (2018). Schizophrenia and creativity: A meta-analytic review. *Schizophrenia Research*, *195*, 23-31. https://doi.org/10.1016/j.schres.2017.08.036

Acar, S., & Runco, M. A. (2014). Assessing associative distance among ideas elicited by tests of divergent thinking. *Creativity Research Journal*, *26*, 229–238. https://doi.org/10.1080/10400419.2014.901095

Acar, S. & Runco, M. A. (2015). Thinking in multiple directions: Hyperspace categories in divergent thinking. *Psychology of Aesthetics, Creativity, and the Arts*, *9*, 41–53. https://doi.org/10.1037/a0038501

Akiskal, H. S., Placidi, G. F., Maremmani, I., Signoretta, S., Liguori, A., Gervasi, R.,...Puzantian,V.R. (1998). TEMPS-I: delineating the most discriminant traits of the cyclothymic, depressive, hyperthymic and irritable temperaments in a nonpatient population. *Journal of Affective Disorders.* 51, 7–19. https://doi: 10.1016/s0165-0327(98)00152-9

Albert, R. S., & Runco, M. A. (1988). Independence and the creative potential of gifted and exceptionally gifted boys. *Journal of Youth and Adolescence*, *18*, 221-230. https://doi.org/10.1007/BF02139037

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization.

Journal of Personality and Social Psychology, 45, 357–376. https://doi.org/10.1037/0022-3514.45.2.357

Averill, J. R. (1999). Individual differences in emotional creativity: Structure and correlates. *Journal of Personality, 67*, 331-371.

Averill, J. R. (2009). Emotional creativity: Toward "spiritualizing the passions" In S. J. Lopez & C. R. Snyder (Eds.), *Oxford library of psychology. Oxford handbook of positive psychology* (pp. 249-257). New York, NY, US: Oxford University Press.

Averill, J. R., Chon, K. K., & Hahn, D. W. (2001). Emotions and creativity, East and West. *Asian Journal of Social Psychology, 4*, 165-183. https://doi.org/10.1111/1467-839X.00084

Baas, M., Nijstad, B. A., Boot, N. C., & De Dreu, C. K. (2016). Mad genius revisited: Vulnerability to psychopathology, biobehavioral approach-avoidance, and creativity. *Psychological Bulletin, 142*, 668. https://doi.org/10.1037/bul0000049

Baas, M., Nijstad, B. A., Koen, J., Boot, N. C., & De Dreu, C. K. W. (2019). Vulnerability to psychopathology and creativity: The role of approach-avoidance motivation and novelty seeking. *Psychology of Aesthetics, Creativity, and the Arts.* Advance online publication. https://doi.org/10.1037/aca0000223

Bandalos, D. L. (2018). *Methodology in the social sciences. Measurement theory and applications for the social sciences.* New York, NY, US: Guilford Press.

Barbot, B., Hass, R. W., & Reiter-Palmon, R. (2019). Creativity assessment in psychological research: (Re)setting the standards. *Psychology of Aesthetics, Creativity, and the Arts, 13*, 233-240. https://doi.org/10.1037/aca0000233

Barron, F. (1955). The disposition toward originality. *The Journal of Abnormal and Social*

Psychology, *51*, 478–485. https://doi.org/10.1037/h0048073

Barron, F. (1957). Originality in Relation to Personality and Intellect. *Journal of Personality*, *25*, 730–743. https://doi.org/10.1111/1467-6494.ep8930936

Barron, F. (1963). *Creativity and psychological health.* Princeton, NJ: Van Nostrand.

Barron, F., & Harrington, D. M. (1981). Creativity, intelligence, and personality. *Annual Review of Psychology*, *32*, 439-476. doi:10.1146/annurev.ps.32.020181.002255

Basadur, M. (1995). Optimal ideation-evaluation ratios. *Creativity Research Journal*, *8*, 63–75. https://doi.org/10.1207/s15326934crj0801_5

Basadur, M., & Basadur, T. (2011). Where are the generators?. *Psychology of Aesthetics, Creativity, and the Arts*, *5*, 29-42. https://doi.org/10.1037/a0017757

Basadur, M., Runco, M. A., & Vega, L. A. (2000). Understanding how creative thinking skills, attitudes and behaviors work together: A causal process model. *The Journal of Creative Behavior*, *34*, 77–100. https://doi.org/10.1002/j.2162-6057.2000.tb01203.x

Baumann, N. (2012). Autotelic personality. In S. Engeser (Ed.), *Advances in flow research* (pp. 165-186). New York, NY: Springer.

Beghetto, R. A. (2014). Creative mortification: An initial exploration. *Psychology of Aesthetics, Creativity, and the Arts*, *8*, 266-276. http://dx.doi.org/10.1037/a0036618

Benedek, M., Könen, T., & Neubauer, A. C. (2012). Associative abilities underlying creativity. *Psychology of Aesthetics, Creativity, and the Arts*, *6*, 273-281. https://doi.org/10.1037/a0027059

Benner, M. J., & Tushman, M. L. (2015). Reflections on the 2013 decade award—'Exploitation,

Exploration, and Process Management: The Productivity Dilemma Revisited' ten years later. *The Academy of Management Review*, *40*, 497-514. https://doi.org/10.5465/amr.2015.0042

Carson, S. H., Peterson, J. B., & Higgins, D. M. (2003). Decreased latent inhibition is associated with increased creative achievement in high-functioning individuals. *Journal of Personality and Social Psychology*, *85*(3), 499-506. https://doi.org/10.1037/0022-3514.85.3.499

Castillo, M. I., Cooke, M. L., Macfarlane, B., & Aitken, L. M. (2016). Trait anxiety but not state anxiety during critical illness was associated with anxiety and depression over 6 months after ICU. *Critical Care Medicine*, *44*, 100-110. https://doi.org/10.1097/CCM.0000000000001356.

Cattani, G. & Ferriani S. (2008). A core/periphery perspective on individual creative performance: Social networks and cinematic achievements in the Hollywood film industry. *Organizational Science*, 19, 824-844. https://doi.org/10.1287/orsc.1070.0350

Charlton, S., & Bakan, P. (1989). Cognitive complexity and creativity. *Imagination, Cognition and Personality*, *8*, 315–322. https://doi.org/10.2190/C21K-GM0L-AV83-3P4H

Cohen, L. M. (2012). Adaptation and creativity in cultural context. *Revista de Psicología*, *30*(1), 3–18.

Cohen, L. M. & Ambrose, D. A. (1999). Adaptation and creativity. In R. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity* (Vol. 1, pp. 9-22). San Diego, CA: Academic Press.

Collins, M. A., & Amabile, T. M. (1999). Motivation and Creativity. In R. J. Sternberg (Ed.), *Handbook of Creativity* (pp. 297–312). Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511807916.017

Costa Jr, P. T., McCrae, R. R., & Kay, G. G. (1995). Persons, places, and personality: Career assessment using the Revised NEO Personality Inventory. *Journal of Career Assessment*, *3*, 123-139. https://doi.org/10.1177/106907279500300202

Costa, P. T., McCrae, R. R., & Kay, G. G. (1995). Persons, places, and personality: Career assessment using the Revised NEO Personality Inventory. *Journal of Career Assessment*, *3*, 123-139. https://doi.org/10.1177/106907279500300202

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16,* 297-334. https://doi.org/10.1007/BF02310555

Cropley, A. J. (1999). Creativity and cognition: Producing effective novelty. *Roeper Review*, *21*, 253-260. https://doi.org/10.1080/02783199909553972

Cropley, A. (2006). In Praise of Convergent Thinking. *Creativity Research Journal*, *18,* 391–404. https://doi.org/10.1207/s15326934crj1803_13

Csikszentmihalyi, M. (1996). *Creativity: The psychology of discovery and invention*. New York, NY, US: HarperCollins Publishers.

Csikszentmihalyi, M., & Getzels, J. W. (1971). Discovery-oriented behavior and the originality of creative products: A study with artists. *Journal of Personality and Social Psychology*, *19*, 47-52. https://doi.org/10.1037/h0031106

Csikszentmihalyi, M., & Getzels, J. W. (1988). Creativity and problem finding in art. In F. H. Farley & R. W. Neperud (Eds.), *The foundations of aesthetics, art, & art education* (pp. 91-116). New York, NY, England: Praeger Publishers.

Davey, G. C. L., & Meeten, F. (2016). The perseverative worry bout: A review of cognitive, affective and motivational factors that contribute to worry perseveration. *Biological Psychology*, *121*, 233–243. https://doi.org/10.1016/j.biopsycho.2016.04.003

Davis, G. A. (1975). In frumious pursuit of the creative person. *The Journal of Creative Behavior*, *9*, 75-87. https://doi.org/10.1002/j.2162-6057.1975.tb00561.x

Davis, G. A. (1999). Barriers to creativity and creative attitudes. In M.A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity*, pp. 165-174. San Diego, CA: Academic Press.

Davis, S. N., Keegan, R. T., & Gruber, H. E. Creativity as purposeful work: The evolving systems approach. In M.A. Runco (Ed.), *Creativity research handbook* (Vol. 2, pp. 199-232). Cresskill, NJ: Hampton Press.

Davis, G. A., & Subkoviak, M. J. (1975). Multidimensional analysis of a personality-based test of creative potential. *Journal of Educational Measurement*, *12*, 37-43. https://doi.org/10.1111/j.1745-3984.1975.tb01007.x

Dawson, V. L., D'Andrea, T., Affinito, R., & Westby, E. L. (1999). Predicting creative behavior: A reexamination of the divergence between traditional and teacher-defined concepts of creativity. *Creativity Research Journal*, *12*, 57-66. https://doi.org/10.1207/s15326934crj1201_7

DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology, 93*, 880–96. https://doi.org/10.1037/0022–3514.93.5.880

Dudek, S. Z., Bernèche, R., Bérubé, H., & Royer, S. (1991). Personality determinants of the commitment to the profession of art. *Creativity Research Journal, 4*, 367-389. http://dx.doi.org/10.1080/10400419109534412

Edwards, S. M. (2001). The technology paradox: Efficiency versus creativity. Creativity *Research Journal*, *13*, 221-228. https://doi.org/10.1207/S15326934CRJ1302_9

Ekvall, G. (1997). Organizational conditions and levels of creativity. *Creativity and Innovation*

Management, *6*, 195–205. https://doi.org/doi:10.1111/1467-8691.00070

Eysenck, H. J. (1993). Creativity and personality: Suggestions for a theory. *Psychological Inquiry*, *4*, 147-178. https://doi.org/10.1207/s15327965pli0403_1

Helson, R. (1999). A Longitudinal Study of Creative Personality in Women. *Creativity Research Journal*, *12*, 89–101. https://doi.org/10.1207/s15326934crj1202_2

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, *2*, 290-309. https://doi.org/10.1207/s15327957pspr0204_5

Feist, G. J. (1999a). The influence of personality on artistic and scientific creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 273-296). New York, NY, US: Cambridge University Press.

Feist, G. J. (2010). The function of personality in creativity: The nature and nurture of the creative personality. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 113-130). New York, NY, US: Cambridge University Press. https://doi.org/10.1017/CBO9780511763205.009

Finke, R. A., Ward, T. B., & Smith, S. M. (1992). Creative cognition: Theory, research and applications. Cambridge, MA: MIT Press.

Fleeson, W. (2007). Situation-based contingencies underlying trait-content manifestation in behavior. *Journal of Personality*, *75*, 825–862. https://doi.org/10.1111/j.1467-6494.2007.00458.x

Foss, L., Woll, K., & Moilanen, M. (2013). Creativity and implementations of new ideas: do organisational structure, work environment and gender matter?. *International Journal of Gender and Entrepreneurship*, *5*, 298-322.

Furnham, A. (2017). Personality Traits, Personality Disorders, and Creativity. In G. Feist, R. Reiter-Palmon, & J. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (Cambridge Handbooks in Psychology, pp. 251-272). Cambridge: Cambridge University Press. doi:10.1017/9781316228036.014

Fürst, G., & Lubart, T. (2017). An integrative approach to the creative personality: Beyond the big five paradigm. In G. J. Feist, R. Reiter-Palmon, & J. C. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (pp. 140-164). New York, NY, US: Cambridge University Press. https://doi.org/10.1017/9781316228036.009

Galesic, M., & Bosnjak, M. (2009). Effects of questionnaire length on participation and indicators of response quality in a web survey. *Public Opinion Quarterly, 73,* 349–360. https://doi.org/10.1093/poq/nfp031

Gallup Organization. (2017). *American workplace survey*. Washington, D.C: Gallup Organization.

Gardner, H. (1994). The creators' patterns. In M. A. Boden (Ed.), *Dimensions of creativity* (pp. 143-158). Cambridge, MA, US: The MIT Press.

Gardner, H., & Wolf, C. (1994). The fruits of asynchrony: A psychological examination of creativity. In D. H. Feldman, M. Csikszentmihalyi, & H. Gardner (Eds.), *Changing the world: A framework for the study of creativity* (pp. 47–68). Westport, CT: Praeger.

Getzels, J. W., & Jackson, P. W. (1962). *Creativity and intelligence: Explorations with gifted students*. Oxford: Wiley.

Gilson, L. L., & Madjar, N. (2011). Radical and incremental creativity: Antecedents and processes. *Psychology of Aesthetics, Creativity, and the Arts*, *5*, 21-28. https://doi.org/10.1037/a0017863

Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. C. (2006). The International Personality Item Pool and the future of public-domain personality measures. *Journal of Research in Personality, 40*, 84-96.

Gordon, W. J. J. (1961). Synectics: The development of creative capacity. Oxford, England: Harper.

Goth, K., Foelsch, P., Schlüter-Müller, S., Birkhölzer, M., Jung, E., Pick, O., & Schmeck, K. (2012). Assessment of identity development and identity diffusion in adolescence - Theoretical basis and psychometric properties of the self-report questionnaire AIDA. *Child and Adolescent Psychiatry and Mental Health, 6,* 27. https://doi.org/10.1186/1753-2000-6-27

Gough, H. G. (1979). A Creative Personality Scale for the Adjective Check List. *Journal of Personality and Social Psychology, 37,* 1398–1405. https://doi.org/10.1037/0022-3514.37.8.1398

Guilford, J. P. (1950). Creativity. *American Psychologist, 5*, 444-454. https://doi.org/10.1037/h0063487

Guilford, J. P. (1956). The structure of intellect. *Psychological Bulletin, 53,* 267-293. https://doi.org/10.1037/h0040755

Guilford, J. P. (1973). Characteristics of creativity. Retrieved from https://eric.ed.gov/?id=ED080171

Gutbezahl, J., & Averill, J.R. (1996) Individual differences in emotional creativity as manifested in words and Pictures, *Creativity Research Journal, 9* 327-337, https://doi.org/10.1207/s15326934crj0904_4

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A*

regression-based approach. New York, NY: Guilford Press.

Helson, R. (1996). In Search of the Creative Personality. *Creativity Research Journal*, *9*, 295–306. https://doi.org/10.1207/s15326934crj0904_1

Helson, R., Roberts, B., & Agronick, G. (1995). Enduringness and change in creative personality and the prediction of occupational creativity. *Journal of Personality and Social Psychology*, *69*, 1173–1183. https://doi-org/10.1037/0022-3514.69.6.1173

Hodgson, D., & Briand, L. (2013). Controlling the uncontrollable: 'Agile' teams and illusions of autonomy in creative work. *Work, Employment and Society*, *27*, 308-325. https://doi.org/10.1177/0950017012460315

Hocevar, D. (1979). Ideational fluency as a confounding factor in the measurement of originality. *Journal of Educational Psychology, 71*(2), 191-196. https://doi.org/10.1037/0022-0663.71.2.191

Hugick, L. & Best, J. (2008). Questionnaire length. In P. J. Lavrakas (Ed.), *Encyclopedia of survey research methods* (pp. 660-660). Thousand Oaks, CA: Sage Publications, Inc. https://doi.org/10.4135/9781412963947.n426

Hunter, S. T., Bedell, K. E., & Mumford, M. D. (2007). Climate for creativity: A quantitative review. *Creativity Research Journal*, *19*, 69-90. https://doi.org/10.1080/10400410709336883

Hunter, J. A., Abraham, E. H., Hunter, A. G., Goldberg, L. C., & Eastwood, J. D. (2016). Personality and boredom proneness in the prediction of creativity and curiosity. *Thinking Skills and Creativity, 22*, 48-57. https://doi.org/10.1016/j.tsc.2016.08.002

Ivcevic, Z., & Mayer, J. D. (2009). Mapping dimensions of creativity in the life-space. *Creativity Research Journal*, *21*, 152-165.

Jay, E., & Perkins, D. (1997). Creativity's compass: A review of problem finding. In M. A. Runco (Ed.), *Creativity research handbook (Vol. 1, pp. 257-293)*. Cresskill, NJ: Hampton Press.

Jayawickreme, E., Zachry, C. E., & Fleeson, W. (2019). Whole Trait Theory: An integrative approach to examining personality structure and process. *Personality and Individual Differences*, *136*, 2–11. https://doi.org/https://doi.org/10.1016/j.paid.2018.06.045

Judge, T. A., & Zapata, C. P. (2015). The person–situation debate revisited: Effect of situation strength and trait activation on the validity of the big five personality traits in predicting job performance. *Academy of Management Journal*, *58*, 1149–1179. https://doi.org/10.5465/amj.2010.0837

Kandler, C., Riemann, R., Angleitner, A., Spinath, F. M., Borkenau, P., & Penke, L. (2016). The nature of creativity: The roles of genetic factors, personality traits, cognitive abilities, and environmental sources. *Journal of Personality and Social Psychology*, *111*, 230–249. https://doi.org/10.1037/pspp0000087

Karwowski, M. (2012). Did curiosity kill the cat? Relationship between trait curiosity, creative self-efficacy and creative personal identity. *Europe's Journal of Psychology*, *8*, 547-558. https://doi.org/https://doi.org/10.5964/ejop.v8i4.513

Karwowski, M., & Beghetto, R. A. (2018). Creative behavior as agentic action. *Psychology of Aesthetics, Creativity, and the Arts*. Advance online publication. https://doi.org/10.1037/aca0000190

Karwowski, M., Lebuda, I., & Wiśniewska, E. (2018). Measuring creative self-efficacy and creative personal identity. *International Journal of Creativity & Problem Solving*, *28*, 45-58.

Karwowski, M., Lebuda, I., Wisniewska, E., & Gralewski, J. (2013). Big five personality traits as the predictors of creative self-efficacy and creative personal identity: Does gender matter? *Journal of Creative Behavior*, *47,* 215–232. https://doi.org/10.1002/jocb.32

Kaufman, J. C. (2019). Self-assessments of creativity: Not ideal, but better than you think. *Psychology of Aesthetics, Creativity, and the Arts*, *13*(2), 187-192. http://dx.doi.org/10.1037/aca0000217

Kaufman, J. C., & Baer, J. (2004). Hawking's haiku, Madonna's math: Why it is hard to be creative in every room of the house. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 3-19). Washington, DC, US: American Psychological Association. http://dx.doi.org/10.1037/10692-001

Kaufman, J. C., & Beghetto, R. A. (2013). In praise of Clark Kent: Creative metacognition and the importance of teaching kids when (not) to be creative. *Roeper Review: A Journal on Gifted Education, 35*, 155-165. https://doi.org/10.1080/02783193.2013.799413

Kaufman, J. C., Cole, J. C., & Baer, J. (2009). The construct of creativity: Structural model for self-reported creativity ratings. *The Journal of Creative Behavior*, *43*, 119-134. https://doi.org/10.1002/j.2162-6057.2009.tb01310.x

Kaufman, S. B., Quilty, L. C., Grazioplene, R. G., Hirsh, J. B., Gray, J. R., Peterson, J. B., & DeYoung, C. G. (2016). Openness to experience and intellect differentially predict creative achievement in the arts and sciences. *Journal of Personality*, *84*. https://doi.org/10.1111/jopy.12156

Kerr, B., & McKay, R. (2013). Searching for tomorrow's innovators: Profiling creative adolescents. *Creativity Research Journal, 25*, 21-32.

Kerr B.K., & Vuyk M.A. (2013) Career development for creatively gifted students. In K.H. Kim, J.C. Kaufman, J. Baer, & B. Sriraman B. (Eds.), *Creatively gifted Students are not like other gifted students* (Advances in Creativity and Giftedness, Vol. 5, pp. 137-151). Sense Publishers: Rotterdam, The Netherlands.

Khalil, R., Godde, B., & Karim, A. A. (2019). The link between creativity, cognition, emotion and underlying neural mechanisms. *Frontiers in Neural Circuits*, *13*, 18. https://doi.org/10.3389/fncir.2019.00018

Kim H. Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative dentistry & endodontics*, *38*, 52–54. doi:10.5395/rde.2013.38.1.52

Kim, K. H., & Hull, M. F. (2012). Creative personality and anticreative environment for high school dropouts. *Creativity Research Journal*, *24*(2-3), 169-176. https://doi.org/10.1080/10400419.2012.677318

Kirton, M. (1976). Adaptors and innovators: A description and measure. *Journal of Applied Psychology*, 61, 622. https://doi.org/10.1037/0021-9010.61.5.622

Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., ... & Eaton, N. R. (2017). The Hierarchical Taxonomy of Psychopathology (HiTOP): a dimensional alternative to traditional nosologies. *Journal of Abnormal Psychology*, *126*, 454. https://doi.org/10.1037/abn0000258

Kulas, J. T., & Stachowski, A. A. (2013). Respondent rationale for neither agreeing nor disagreeing: Person and item contributors to middle category endorsement intent on Likert personality indicators. *Journal of Research in Personality*, *47*, 254–262. https://doi.org/https://doi.org/10.1016/j.jrp.2013.01.014

Lebuda, I., & Karwowski, M. (2013). Tell me your name and I'll tell you how creative your work is: Author's name and gender as factors influencing assessment of products' creativity in four different domains. *Creativity Research Journal*, *25*, 137–142. https://doi.org/10.1080/10400419.2013.752297

Luescher, R., Barthelmess, P. Y., Kim, S., Richter, U. H., & Mittag, M. (2019). Conceptualizing creativity: General and cultural biases in Gough's Creative Personality Scale. *The Journal of Creative Behavior*, *53*, 30–43. https://doi.org/10.1002/jocb.160

Lievens, F., Lang, J. W. B., De Fruyt, F., Corstjens, J., Van de Vijver, M., & Bledow, R. (2018). The predictive power of people's intraindividual variability across situations: Implementing whole trait theory in assessment. *Journal of Applied Psychology*, *103*, 753–771. https://doi.org/10.1037/apl0000280

Lubart, T. I., Zenasni, F., & Barbot, B. (2013). Creative potential and its measurement. *International Journal of Talent Development and Creativity*, *1*, 41-51.

MacKinnon, D. W. (1962). The nature and nurture of creative talent. *American psychologist*, *17*, 484. https://doi.org/10.1037/h0046541

Mackinnon, D. W. (1965). Personality and the realization of creative potential. *American Psychologist*, *20*, 273. https://doi.org/10.1037/h0022403

Madjar, N., Greenberg, E., & Chen, Z. (2011). Factors for radical creativity, incremental creativity, and routine, noncreative performance. *Journal of Applied Psychology*, *96*(4), 730-743. https://doi.org/10.1037/a0022416

Madrid, H. P., & Patterson, M. G. (2016). Creativity at work as a joint function between openness to experience, need for cognition and organizational fairness. *Learning and Individual Differences*, *51*, 409–416. https://doi.org/10.1016/j.lindif.2015.07.010

Maples-Keller, J. L., Williamson, R. L., Sleep, C. E., Carter, N.T., Campbell, W. K., & Miller, J. D. (2019). Using item response theory to develop a 60- item representation of the NEO PI – R using the International Personality Item Pool : Development of the IPIP – NEO – 60. *Journal of Personality Assessment*, *0*, 1–12. https://doi.org/10.1080/00223891.2017.1381968

Martinsen, Ø. L. (1993). Insight problems revisited: The influence of cognitive styles and experience on creative problem solving. *Creativity Research Journal*, *6*, 435–447. https://doi.org/10.1080/10400419309534498

Martinsen, Ø. L. (2011). The creative personality: A synthesis and development of the creative person profile. *Creativity Research Journal*, *23*, 185-202. https://10.1080/10400419.2011.595656

Martinsen, Ø. L., Arnulf, J. K., Furnham, A., & Lang-Ree, O. C. (2019). Narcissism and creativity. *Personality and Individual Differences*, *142,* 166-171. https://doi.org/10.1016/j.paid.2018.09.032

Maslow, A. H. (1962). Creativity in self-actualizing people. In A. Maslow, *Toward a psychology of being* (pp. 127-137). Princeton, NJ, US: D Van Nostrand. https://doi.org/10.1037/10793-010

McCain, J., Gentile, B., & Campbell, W. K. (2015). A psychological exploration of engagement in geek culture. *PloS one*, *10*(11), e0142200. https://doi.org/10.1371/journal.pone.0142200.

McMillan, R., Kaufman, S. B., & Singer, J. L. (2013). Ode to positive constructive daydreaming. *Frontiers in Psychology*, *4*, 626. https://doi.org/10.3389/fpsyg.2013.00626

Meade, A. (2010). Restriction of range. In N. J. Salkind (Ed.), *Encyclopedia of research design*

(pp. 1279-1280). Thousand Oaks, CA: SAGE Publications, Inc. https://doi.org/10.4135/9781412961288.n388

Mednick, S.A. (1962). The associative basis of the creative process. *Psychological Review, 69,* 220-232. https://doi.org/10.1037/h0048850

Mockros, C. A., & Csikszentmihalyi, M. (2014). The social construction of creative lives. In M. Csikszentmihalyi (Ed.), *The systems model of creativity: The collected works of Mihaly Csikszentmihaly* (pp. 127–160). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-017-9085-7_9

Mueller, J. S., Melwani, S., & Goncalo, J. A. (2012). The bias against creativity: Why people desire but reject creative ideas. *Psychological Science*, *23*, 13–17. https://doi.org/10.1177/0956797611421018

Mumford, M. D., Costanza, D. P., Threlfall, K. V., Baughman, W. A., & Reiter-Palmon, R. (1993). Personality variables and problem-construction activities: An exploratory investigation. *Creativity Research Journal*, *6*, 365–389. https://doi.org/10.1080/10400419309534493

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin*, *103*, 27. https://.doi.org/10.1037/0033-2909.103.1.27

Paek, S. H., & Runco, M. A. (2017). Dealing with the criterion problem by measuring the quality and quantity of creative activity and accomplishment. *Creativity Research Journal*, *29*, 167-173. https://doi.org/10.1080/10400419.2017.1304078

Paek, S. H., & Sumners, S. E. (2017). The indirect effect of teachers' creative mindsets on teaching creativity. *The Journal of Creative Behavior*. https://doi.org/10.1002/jocb.180

Paek, S., Sumners, S., & Sharpe, D. (2019). Teachers' beliefs of creative children. *The Journal*

of Creative Behavior. https://doi.org/10.1002/jocb.400

Patston, T. J., Cropley, D. H., Marrone, R. L., & Kaufman, J. C. (2018). Teacher implicit beliefs of creativity: Is there an arts bias?. *Teaching and Teacher Education, 75,* 366-374. https://doi.org/10.1016/j.tate.2018.08.001

Perkins, D. N. (1983), Novel remote analogies seldom contribute to discovery. *The Journal of Creative Behavior, 17*, 223-239. https://doi.org/10.1002/j.2162-6057.1983.tb00358.x

Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification.* New York: Oxford University Press and Washington, DC: American Psychological Association.

Price, L. R. (2017). *Psychometric methods: Theory into practice*. Guilford Publications.

Proudfoot, D., Kay, A. C., & Koval, C. Z. (2015). A gender bias in the attribution of creativity: Archival and experimental evidence for the perceived association between masculinity and creative thinking. *Psychological Science, 26*, 1751-1761. https://doi.org/10.1177/0956797615598739

Puryear, J. S., Kettler, T., & Rinn, A. N. (2017). Relationships of personality to differential conceptions of creativity: A systematic review. *Psychology of Aesthetics, Creativity, and the Arts, 11*, 59–68. https://doi.org/10.1037/aca0000079

Revelle, W. & Wilt, J. (2012, September). On when a factor is a general factor. Presented at the EAAP experts meeting on the structure of personality. Dubrovnik, Croatia. Retrieved from https://www.personality-project.org/revelle/presentations/general.pdf

Rhodes, M. (1961). An analysis of creativity, *Phi Delta Kappan, 42*, 305-310.

Richards, R. (1990). Everyday creativity, eminent creativity, and health: “Afterview” for CRJ

issues on creativity and health. *Creativity Research Journal, 3*, 300–326. https://doi.org/10.1080/10400419009534363

Richards, R. (2007). Everyday creativity: Our hidden potential. *Everyday Creativity and New Views of Human Nature: Psychological, Social, and Spiritual Perspectives.*, 25–54. https://doi.org/10.1037/11595-001

Richards, R., Kinney, D. K., Benet, M., & Merzel, A. P. (1988). Assessing everyday creativity: Characteristics of the Lifetime Creativity Scales and validation with three large samples. *Journal of Personality and Social Psychology, 54*, 476-485. http://dx.doi.org/10.1037/0022-3514.54.3.476

Ritter, S. M., Damian, R. I., Simonton, D. K., van Baaren, R. B., Strick, M., Derks, J., & Dijksterhuis, A. (2012). Diversifying experiences enhance cognitive flexibility. *Journal of Experimental Social Psychology, 48*, 961-964. https://doi.org/10.1016/j.jesp.2012.02.009

Root-Bernstein, R. S. (1988). Setting the stage for discovery. *The Sciences, 28*(3), 26-34. https://doi.org/10.1002/j.2326-1951.1988.tb03019.x

Root-Bernstein , M., & Root-Bernstein , R. (2006). Imaginary worldplay in childhood and maturity and its impact on adult creativity. *Creativity Research Journal, 18*, 405–425. https://doi.org/10.1207/s15326934crj1804_1

Rosenman, M. F. (1988). Serendipity and scientific discovery. *Journal of Creative Behavior, 22*, 132-138.

Runco, M. A. (1994). Creativity and its discontents. In M. P. Shaw & M. A. Runco (Eds.), *Creativity and Affect* (pp. 53-65). Norwood, NJ: Ablex.

Runco, M. A. (2004). Everyone has creative potential. In R. J. Sternberg, E. L. Grigorenko, & J.

L. Singer (Eds.), *Creativity: From potential to realization* (pp. 21–30). Washington, DC: American Psychological Association. https://doi.org/10.1037/10692-002

Runco, M. A. (2007). A hierarchical framework for the study of creativity. *New Horizons in Education*, *55*(3), 1–9.

Runco, M. A. (2008). Creativity and education. *New Horizons in Education*, *56*, 107-115.

Runco, M. A. (2014). "Big C, Little c" creativity as a false dichotomy: Reality is not categorical. *Creativity Research Journal*, *26*, 131–132. https://doi.org/10.1080/10400419.2014.873676

Runco, M. A. (2015). A commentary on the social perspective on creativity. *Creativity. Theories – Research - Applications*, *2*, 21–31. https://doi.org/10.1515/ctra-2015-0003

Runco, M. A. (2016). Commentary: Overview of developmental perspectives on creativity and the realization of potential. *New Directions for Child & Adolescent Development*, *2016*(151), 97–109. https://doi-org.ccl.idm.oclc.org/10.1002/cad.20145

Runco, M. A. (2017). Comments on where the creativity research has been and where is it going. *Journal of Creative Behavior*, *51*, 308–313. https://doi.org/10.1002/jocb.189

Runco, M. A., Acar, S., & Cayirdag, N. (2017). A closer look at the creativity gap and why students are less creative at school than outside of school. *Thinking Skills and Creativity*, *24*, 242-249. https://doi.org/10.1016/j.tsc.2017.04.003

Runco, M. A., & Bahleda, M. D. (1986). Implicit theories of artistic, scientific, and everyday creativity. *The Journal of Creative Behavior, 20*, 93-98. https://doi.org/10.1002/j.2162-6057.1986.tb00423.x

Runco, M. A., Campbell, W. K., Jaeger, G., McCain, J., & Gentile, B. (2016). Comparisons of

the creative class and regional creativity with perceptions of community support and community barriers. *Business Creativity and the Creative Economy*, *2*(1), 24–32. https://doi.org/10.18536/bcce.2016.06.2.1.04

Runco, M. A., & Cayirdag, N. (2012). The theory of personal creativity and implications for the fulfillment of children's potentials. In O. N. Saracho (Ed.), *Contemporary perspectives on research in creativity in early childhood education* (pp. 31-43). Charlotte, NC: IAP Information Age Publishing.

Runco, M. A., & Chand, I. (1995). Cognition and creativity. *Educational psychology review*, *7*, 243-267. https://doi.org/10.1007/BF02213373

Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal*, *24*, 92-96. doi:10.1080/10400419.2012.650092

Runco, M. A., Nemiro, J., & Walberg, H. J. (1998). Personal explicit theories of creativity. *The Journal of Creative Behavior*, *32*, 1-17. https://doi.org/10.1002/j.2162-6057.1998.tb00803.x

Runco, M. A., & Pina, J. (2013). Imagination and personal creativity. In M. Taylor, M. Taylor (Eds.), *The Oxford handbook of the development of imagination* (pp. 379-386). New York, NY, US: Oxford University Press.

Runco, M. A., Plucker, J. A., & Lim, W. (2001). Development and psychometric integrity of a measure of ideational behavior. *Creativity Research Journal*, *13*, 393-400. https://doi.org/10.1207/S15326934CRJ1334_16

Russ, S. W. (2016). Pretend play: Antecedent of adult creativity. *New directions for child and adolescent development*, *2016*(151), 21-32. https://doi.org/10.1002/cad.20154

Sawyer, K. (1992). Improvisational Creativity: An Analysis of Jazz Performance. *Creativity*

Research Journal, *5*, 253–263. https://doi.org/10.1080/10400419209534439

Sawyer, R. K. (1999). The emergence of creativity. *Philosophical Psychology*, *12*(4), 447–469. https://doi.org/10.1080/095150899105684

Sawyer, R. K. (2018). How artists create: An empirical study of MFA painting students. *The Journal of Creative Behavior*, *52*(2), 127-141. https://doi.org/10.1002/jocb.136

Sheldon, K. M., Ryan, R. M., Rawsthorne, L. J., & Ilardi, B. (1997). Trait self and true self: Cross-role variation in the Big-Five personality traits and its relations with psychological authenticity and subjective well-being. *Journal of Personality and Social Psychology*, *73*, 1380–1393. https://doi.org/10.1037/0022-3514.73.6.1380

Shepard, A., Tadik, H., & Runco, M.A. (2019). *How much creative potential is expressed at work?* Manuscript submitted for publication.

Silvia, P. J., Fayn, K., Nusbaum, E. C., & Beaty, R. E. (2015). Openness to experience and awe in response to nature and music: Personality and profound aesthetic experiences. *Psychology of Aesthetics, Creativity, and the Arts*, *9*, 376-384. https://doi.org/10.1037/aca0000028

Simms, L. J., Zelazny, K., Williams, T. F., & Bernstein, L. (2019). Does the number of response options matter? Psychometric perspectives using personality questionnaire data. *Psychological Assessment*, *31*(4), 557–566. https://doi.org/10.1037/pas0000648.supp

Simon, H. A. (1983). Discovery, invention, and development: human creative thinking. *Proceedings of the National Academy of Sciences*, *80*(14), 4569 LP-4571. https://doi.org/10.1073/pnas.80.14.4569

Simonton, D. K. (2012). Taking the U.S. Patent Office Criteria seriously: A quantitative three-

criterion creativity definition and its implications. *Creativity Research Journal, 24*, 97–106. https://doi.org/10.1080/10400419.2012.676974

Simonton, D. K. (2017). Creative genius and psychopathology: Creativity as positive and negative personality. In G. J. Feist, R. Reiter-Palmon, & J. C. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (pp. 235-250). New York, NY, US: Cambridge University Press.

Smith, J. M., & Alloy, L. B. (2009). A roadmap to rumination: a review of the definition, assessment, and conceptualization of this multifaceted construct. *Clinical Psychology Review, 2*, 116–128. https://doi.org/10.1016/j.cpr.2008.10.003

Sternberg, R., Kaufman, J., & Roberts, A. (2019). The Relation of Creativity to Intelligence and Wisdom. In J. Kaufman & R. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (Cambridge Handbooks in Psychology, pp. 337-352). Cambridge: Cambridge University Press. doi:10.1017/9781316979839.018

Sternberg, R., & Lubart, T. (1991). An investment theory of creativity and its development. *Human Development, 34*, 1-31. https:/doi.org/10.1159/000277029

Sternberg, R., & Lubart, T. (1992). Buy low and sell high: An investment approach to creativity. *Current Directions in Psychological Science, 1*, 1-5. https://doi.org/10.1111/j.1467-8721.1992.tb00002.x

Sternberg, R. J., & Lubart, T. I. (1993). Creative giftedness: A multivariate investment approach. *Gifted Child Quarterly, 37*, 7-15.https://doi.org/10.1177/001698629303700102

Sternberg, R. J., & Lubart, T. I. (1995). *Defying the crowd: Cultivating creativity in a culture of conformity*. New York: Free Press.

Sumners, S., Abdulla, A., Paek, S., & Runco, M. (2019). *Creativity, what it is and what it is not:*

A study of implicit theories. Manuscript submitted for publication.

Taylor, C. L. (2017). Creativity and mood disorder: A systematic review and meta-analysis. *Perspectives on Psychological Science*, *12*, 1040-1076. https://doi.org/10.1177/1745691617699653

Taylor, C. L., Mckay, A. S., & Kaufman, J. C. (2017). Creativity and personality: Nuances of domain and mood. In G. J. Feist, R. Reiter-Palmon, & J. C. Kaufman (Eds.), *Cambridge handbooks in psychology. The Cambridge handbook of creativity and personality research* (pp. 167-186). New York, NY, US: Cambridge University Press.

Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, *88*, 500–517. https://doi.org/10.1037/0021-9010.88.3.500

Tett, R. P., & Guterman, H. A. (2000). Situation trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality*, *34*, 397–423. https://doi.org/10.1006/jrpe.2000.2292

Thrash, T. M., & Elliot, A. J. (2003). Inspiration as a psychological construct. *Journal of Personality and Social Psychology, 84*, 871-889. http://dx.doi.org/10.1037/0022-3514.84.4.871

Torrance, E. P. (1964). Identifying the Creatively Gifted Among Economically and Culturally Disadvantaged Children. *Gifted Child Quarterly*, *8*, 171–176. https://doi.org/10.1177/001698626400800401

Torrance, E. P. (1979). *The search for satori & creativity*. Buffalo, N.Y: Creative Education Foundation.

Torrance, E.P. (2000). *Research review for the Torrance Tests of Creative Thinking figural and*

verbal forms A and B. Bensenville, IL: Scholastic Testing Service.

Unsworth, K. L., & Clegg, C. W. (2010). Why do employees undertake creative action?. *Journal of Occupational and Organizational Psychology*, *83*, 77-99. https://doi.org/10.1348/096317908X398377

von Stumm, S., Chung, A., & Furnham, A. (2011). Creative ability, creative ideation and latent classes of creative achievement: What Is the role of personality? *Psychology of Aesthetics, Creativity, and the Arts*, *5*, 107–114. https://doi.org/10.1037/a0020499

Weisberg, R. W. (1988). Problem solving and creativity. In R. J. Sternberg (Ed.), *The nature of creativity: Contemporary psychological perspectives* (pp. 148-176). New York, NY, US: Cambridge University Press.

Westby, E. L., & Dawson, V. L. (1995). Creativity: Asset or burden in the classroom?. *Creativity Research Journal*, *8*, 1-10. https://doi.org/10.1207/s15326934crj0801_1

Zhang, L. & Sternberg, R. J. (2011). Revisiting the investment theory of creativity. *Creativity Research Journal*, *23*, 229–238. https://doi.org/10.1080/10400419.2011.595974

Zuckerman, M. (2015). General and situation-specific traits and states: New approaches to assessment of anxiety and other constructs. In M. Zuckerman & C.D. Spielberger (Eds), *Emotions and anxiety: New concepts, methods, and applications* (pp. 133-174). New York, NY: Taylor & Francis.

Table 4.1

CP-PC Items

Item	Text	Area of Potential
1	Different. You are not like most other people.[a]	Sense of self as different, asynchrony (Gardner & Wolf, 1988; Runco, 1994)
2	Creative. You think or act in a creative fashion.[a]	Sense of self as creative (Barron & Harrington, 1981; Karwowski, Lebuda, & Wiśniewska, 2018)
3	A Nonconformist. You are not afraid to ruffle some feathers, to go against what the crowd is doing.[b]	Nonconformity (Feist, 1998)
4	Authentic. You are genuine, real, true to yourself.[b]	Authenticity (Averill, 1999, 2009; Averill, Chon, & Hahn, 2001)
5	Perceptive. You notice things. Details that others miss are obvious to you.[b]	Perceptiveness/insight (Davis, 1999; Weisberg, 1988)
6	Adaptive. You change how you think or behave based on new information or experiences.[b]	Adaptiveness and openness to change (Cohen & Ambrose, 1999; Cohen, 2012)
7	Complex. The are many different sides to who you are.	Personal complexity (Barron, 1955)
8	Fluid. You do not fit into stereotypes or social prescriptions of being one thing or another.	Rejection of social norms and categorizations (Guilford, 1973; Feist, 1998)
9	Connected. You respond strongly to things like music, art, and nature.	Sensitivity to aesthetic experiences (Runco & Behleda,1986; Silvia, Fayn, Nusbaum, & Beaty, 2015)
10	In-tune. You sense when something is wrong or could be improved.[c]	Problem-finding (Csikszentmihalyi & Getzels, 1988), intuition (Simon, 1983)
11	Self-directed. Even if there is a set way of doing something, you are likely to question or modify it.	Independence of judgement (Barron, 1955)
12	A Divergent Thinker. Your thought process goes in many different directions.	Overinclusive thinking, low latent inhibition, perceptual openness (Carson, Peterson, & Higgins, 2003; Eysenck, 1993)

13	An Explorer. You try or consider many ways of doing things.	Resistance to premature closure, discovery-oriented behavior (Csikszentmihalyi & Getzels, 1971)
14	Open. You are willing to consider strange or unique ideas or courses of action.[c]	Openness to ideas or behavior that breaks existing conceptual barriers (Torrance, 1964)
15	Curious. You engross yourself in new information, activities, or hobbies.	Curiosity (Hunter, Abraham, Hunter, Goldberg, & Eastwood, 2015; Karwowski, 2012)
16	Playful. You enjoy banter, cleverness, and life being game-like.	Playfulness (Runco, 2016; Russ, 2016)
17	Imaginative. You think of lots of new ideas and possibilities.	Imagination (Root-Bernstein & Root-Bernstein, 2006; Runco & Pina, 2013)
18	Integrative. You find connections between different ideas and concepts, even if they don't seem related at first.[c]	Associative thinking (Benedek, Könen, & Neubauer, 2012; Mednick, 1962)
19	Inspired. You can find inspiration everywhere, even in everyday things.	Transformation of the familiar (Gordon, 1961), inspiration (Thrash and Elliot, 2003)
20	Thoughtful. You try to understand how things have been done before, so that you can improve upon them.	Gaining and elaborating on domain knowledge (Cropley, 2006; Sawyer, 1992, 1998, 1999)
21	Aware. You are able to think of solutions to problems that haven't been figured out.[c]	Problem evaluation (Basadur, 1995)
22	Passionate. When a topic or activity grabs your interest, you dive deeply into learning about it or doing it.	Intrinsically motivated interest (Amabile, 1983)
23	Independent. You prefer to disregard rules that don't make much sense.	Independence (Albert & Runco, 1988; Feist, 1998)
24	Accepting. You are comfortable around people who others think are different or strange.	Marginality (Cattani & Ferriani, 2008; Runco, 1994)
25	Autonomous. You enjoy doing things your own way, figuring out your own path.	Autonomy (Barron & Harrington, 1981)

26	Full of Ideas. You have so many ideas it sometimes feels like your ideas have ideas.	Ideational fluency (Guilford, 1956; Hocevar, 1979)
27	Childlike. You ask a lot of questions, and don't take initial explanations for granted.	Inquisitiveness, retention of childlike approach to situations (Torrance; 1979)
28	Multifaceted. You can be different things at the same time - happy and sad, reckless and calculated...	Paradoxical traits (Csikszentmihalyi, 1996), cognitive complexity (Charlton & Bakan, 1989; Cropley, 1999)
29	Adventurous. You like the idea of exploring the unfamiliar.	Openness to potential diversifying experiences (Ritter et al., 2012)
30	Boundary-breaking. You enjoy pushing boundaries in what you do.	Radical creativity (Ekvall, 1997; Madjar, Greenberg, & Chen, 2011)
31	A Noticer. You pay attention to the unexpected - things that are surprising, novel, unique.	Alertness to the unexpected (Perkins, 1983; Root-Bernstein, 1988; Rosenman, 1988)
32	Evolving. You actively look for ways to learn and grow.	Tendency toward improvement, breaking away from habits, and integrating new information into cognitive structures (Maslow, 1962; Torrance, 1979)
33	Broad-minded. You enjoy solving problems with multiple possible answers more than those with just one correct answer.	Attraction to ill-structured problems; preference for idea generation (Finke, Ward, & Smith, 1992)
34	Unconventional. You think of new ways to do things, like use words or change your appearance.	Unconventionality and capacity for original interpretations (Barron & Harrington, 1981; Runco, 2016); self-expressive everyday creativity (Ivcevic & Mayer, 2009)
35	Sensitive. You are moved by the beauty or tragedy in things you encounter.	Sensitivity (Csikszentmihalyi, 1996)
36	A Daydreamer. You regularly get lost in thoughts and reflection.	Sensitivity to and absorption in internal world, fantasy-proneness (McCain et al., 2015; McMillan, Kaufman, & Singer, 2013)

37	Psychologically-minded. You explore connections, patterns, and deeper meanings.	Psychological-mindedness (MacKinnon, 1965)
38	A Unique Thinker. Others find your ideas surprising, but to you they seem obvious.	Originality (Gardner, 1994; Runco & Jaeger, 2012), the ability to surprise others with ideas (Simonton, 2012)
39	Divergent. You easily think of multiple perspectives from which to view problems or situations.	Flexibility (Runco & Chand, 1995)
40	An Improver. You see ways to make others' ideas better.	Incremental creativity (Gilson & Madjar, 2011), problem-construction (Mumford, Costanza, Threlfall, Baughman, & Reiter-Palmon, 1993)
41	Interested. You like to learn about many different topics, from watch-making to marine biology.	Broad interests (Barron & Harrington, 1981); gaining of tacit knowledge (Cropley, 2006)
42	Empathetic. It is easy for you to feel the pain and joy of others.	Sensitivity to the experiences of others (Guilford; 1973; Gutbezahl & Averill, 1996)
43	A Novelty Seeker. You get restless always doing the same old thing. .	Preference for novelty (Baas, Nijstad, Boot & De Dreu, 2019; Martinsen, 1993)

[a]Item from SRCT [b]Item adapted from SRCT [c]Item adapted from RIBS

Table 4.2

Descriptive Statistics for Study Measures (n = 368)

				Range	
Variable	*M*	*SD*	α	Potential	Actual
CP-PC	192.38	32.89	.96	43-258	72-258
CP-PCs	123.35	23.27	.95	28-168	42-168
RIBS	89.61	23.01	.96	23-138	23-138
BFAS-T	78.33	13.13	.90	20-100	36-100
BFAS-I	39.54	7.22	.87	10-50	15-50
BFAS-O	38.79	7.87	.87	10-50	12-50
SSCS	42.00	10.52	.95	11-55	11-55
CPI	19.02	5.64	.95	5-25	5-25
CSE	22.98	5.39	.90	6-30	6-30
CAAC Total	44.94	21.54	.93	0-117	1-103
CAAC EC Total	27.30	11.78	.91	0-54	0-54
CAAC EC-Crafts	7.26	4.71	.85	0-18	0-18
CAAC EC-PS	11.89	4.48	.82	0-18	0-18
CAAC EC-Play	8.15	4.36	.77	0-18	0-18
CAAC Writing	4.50	3.83	.71	0-18	0-17
CAAC Music	5.41	4.55	.77	0-18	0-18
CAAC Math-Sci	3.89	4.01	.81	0-18	0-18
CAAC Quality	3.86	2.81	.82	0-9	0-9
Neuroticism	30.36	10.80	.91	12-60	12-60

Note. CP-PC = Creative Personality-Potential Composite; CP-PCs = Creative Personality-Potential Composite Short Form; RIBS = Runco Ideational Behavior Scale; BFAS-T = Big Five Aspects Scales openness and intellect total score; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; SSCS = Short Scale of Creative Self; CPI = Creative Personal Identity; CSE = Creative Self Efficacy; CAAC Total = Creative Activity and Accomplishment Checklist total score; CAAC EC Total = Total of CAAC Everyday Creativity Crafts, PS, and Play scores; CAAC EC-Crafts = Everyday Creativity-Crafts; CAAC EC-PS = Everyday Creativity-Problem-Solving; CAAC EC-Play = Everyday Creativity-Play and Exploration; CAAC Writing = Writing and Language; CAAC Music = Music and Visual Arts; CAAC Math-Sci = Math and Science; CAAC Quality = Social Recognition for Creativity; Neuroticism = IPIP-NEO-60 neuroticism scale scores.

Table 4.3

Bivariate Correlations of Major Variables (n = 368)

Variable	CP-PC	CP-PCs	RIBS	BFAS-T	BFAS-I	BFAS-O	SSCS	CPI	CSE
RIBS	.80	.81							
BFAS-T	.80	.79	.70						
BFAS-I	.68	.67	.58	-					
BFAS-O	.71	.70	.62	-	.51				
SSCS	.79	.79	.74	.77	.64	.69			
CPI	.73	.74	.69	.73	.53	.73	-		
CSE	.77	.77	.73	.73	.69	.59	-	.82	
CAAC Total	.58	.59	.59	.56	.47	.50	.66	.63	.60
CAAC EC Total	.58	.58	.57	.52	.46	.45	.61	.57	.60
CAAC EC-Crafts	.45	.46	.42	.42	.34	.38	.51	.50	.48
CAAC EC-PS	.50	.51	.52	.45	.49	.34	.53	.47	.55
CAAC EC-Play	.56	.56	.55	.51	.44	.45	.56	.52	.54
CAAC Writing	.36	.36	.36	.40	.28	.39	.38	.42	.28
CAAC Music	.39	.40	.39	.40	.27	.41	.47	.51	.38
CAAC Math-Sci	.28	.30	.35	.27	.30	.18[a]	.35	.30	.36
CAAC Quality	.53	.55	.50	.50	.43	.44	.59	.61	.52
Neuroticism	-.42	-.41	-.24	-.39	-.47	-.22	-.44	-.32	-.51

Note. CP-PC = Creative Personality-Potential Composite; CP-PCs = Creative Personality-Potential Composite Short Form; RIBS = Runco Ideational Behavior Scale; BFAS-T = Big Five Aspects Scales openness and intellect total score; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; SSCS = Short Scale of Creative Self; CPI = Creative Personal Identity; CSE = Creative Self Efficacy; CAAC Total = Creative Activity and Accomplishment Checklist total score; CAAC EC Total = Total of CAAC EC Crafts, PS, and Play scores; CAAC EC-Crafts = Everyday Creativity-Crafts; CAAC EC-PS = Everyday Creativity-Problem-Solving; CAAC EC-Play = Everyday Creativity-Play and Exploration; CAAC Writing = Writing and Language; CAAC Music = Music and Visual Arts; CAAC Math-Sci = Math and Science; CAAC Quality = Social Recognition for Creativity; Neuroticism = IPIP-NEO-60 neuroticism scale scores. All p values < .001 unless otherwise noted.

[a]p = .001.

Table 4.4

Hierarchical Regression Analyses Predicting Ideational Behavior, Creative Behavior, and Creative Personal Identity (n = 368)

	Model 1			Model 2		
Variable	B	SE	β	B	SE	β
Ideational Behavior						
(intercept)	-.50	5.30		-21.88***	4.56	
BFAS-I	1.15	.14	.36***	.21	.14	.07
BFAS-O	1.27	.13	.43***	.28	.13	.10*
CP-PC				.48	.04	.69***
R^2		.48			.64	
ΔF		167.46***			172.34***	
CAAC						
(intercept)	-26.39***	5.70		-35.21***	5.72	
BFAS-I	.88	.15	.29***	.39	.17	.13*
BFAS-O	.94	.14	.35***	.43	.16	.16**
CP-PC				.25	.05	.38***
R^2		.31			.36	
ΔF		81.95***			29.79***	
Creative Personal Identity						
(intercept)	-4.69***	1.19		-7.18***	1.15	
BFAS-I	.16	.03	.20***	.02	.03	.03
BFAS-O	.45	.03	.63***	.30	.03	.42***
CP-PC				.07	.01	.41***
R^2		.57			.63	
ΔF		237.59***			59.42***	

Note. CP-PC = Creative Personality-Potential Composite; Creative Activity and Accomplishment Checklist total score; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience.

* p <. 05. ** p < .01. *** p < .001.

Table 4.5

Pattern Matrix for Eight-factor Solution with Promax Rotation (n = 368)

Item	**Factor Loadings**							
	1	2	3	4	5	6	7	8
4. Authentic	**.38**							
5. Perceptive	**.70**							
10. In-tune	**.78**							
18. Integrative	**.62**							
20. Thoughtful	**.71**							
21. Aware	**.83**							
31. A Noticer	**.82**							
32. Evolving	**.35**							
37. Psychologically-minded	**.50**		.34					
38. A Unique Thinker	**.50**				.38			
39. Divergent	**.52**							
40. An Improver	**.91**							
13. An Explorer		**.45**						
16. Playful		**.39**						
29. Adventurous		**.83**						
30. Boundary-breaking		**.67**						
33. Broad-minded	.23	**.22**						
34. Unconventional		**.40**			.32			
43. A Novelty-seeker		**.81**						
7. Complex			**.34**					
12. A Divergent Thinker			**.49**					
27. Childlike			**.41**					
28. Multifaceted			**.32**					
36. A daydreamer			**.71**					
9. Connected				**.35**				
22. Passionate				**.37**				
35. Sensitive				**.85**				
42. Empathetic				**.80**				
1. Different					**.67**			
3. A Nonconformist					**.56**			
8. Fluid					**.55**		.57	
11. Self-directed						**.54**		
23. Independent						**.63**		
24. Accepting						**.33**		
25. Autonomous						**.64**		
6. Adaptive							**.53**	
14. Open							**.47**	
15. Curious			.34				**.31**	
41. Interested							**.35**	
2. Creative								**.77**
17. Imaginative			.36					**.69**
19. Inspired	.31							**.34**
26. Full of Ideas	.38							**.48**
Rotation Sums of Squared Loadings	13.81	10.92	8.00	5.99	5.31	7.43	8.94	9.65

Note. Factor loadings < .30 are omitted, except in the case of item 33.

Table 4.6

Correlations Between Factors of the CP-PC (n = 368)

Factor	1	2	3	4	5	6	7	8
1	1.00							
2	.67	1.00						
3	.54	.51	1.00					
4	.52	.32	.26	1.00				
5	.38	.48	.35	.12	1.00			
6	.58	.57	.32	.27	.36	1.00		
7	.64	.53	.50	.42	.23	.42	1.00	
8	.69	.62	.42	.42	.32	.44	.48	1.00

Table 4.7

Descriptive Statistics for CP-PC Dimensions (n = 368)

Dimension	*M*	*M/i*	*SD*	*α*	Range	
					Potential	Actual
Awareness	55.87	4.66	10.05	.91	12-72	17-72
Novelty	28.64	4.09	7.06	.86	7-42	7-42
Complexity	20.76	4.15	4.99	.74	5-30	5-30
Sensitivity	18.65	4.66	4.16	.78	4-24	4-24
Nonconformity	12.60	4.20	3.02	.68	3-18	3-18
Independence	19.14	4.79	3.39	.72	4-24	7-24
Flexibility	19.25	4.81	3.53	.76	4-24	5-24
Fluency	17.47	4.37	4.74	.88	4-24	4-24

Note. i = number of items in subscale.

Table 4.8

Bivariate Correlations Between CP-PC Dimensions and Study Variables (n = 368)

Variable	Awareness	Novelty	Complexity	Sensitivity	Nonconformity	Independence	Flexibility	Fluency
RIBS	.73	.73	.67	.49	.48	.48	.60	.77
BFAS-T	.74	.64	.64	.60	.40	.49	.70	.73
BFAS-I	.68	.56	.46	.39	.31	.51	.67	.58
BFAS-O	.60	.56	.64	.64	.39	.34	.57	.69
SSCS	.72	.65	.54	.51	.45	.49	.58	.87
CPI	.65	.60	.55	.50	.44	.42	.52	.83
CSE	.74	.65	.48	.47	.42	.52	.59	.82
CAAC Total	.50	.53	.43	.36	.37	.39	.43	.59
CAAC EC Total	.51	.54	.41	.36	.33	.38	.43	.56
CAAC EC-Crafts	.39	.38	.31	.36	.25	.26	.30	.48
CAAC EC-PS	.45	.50	.38	.21	.27	.37	.39	.47
CAAC EC-Play	.49	.52	.39	.36	.35	.37	.42	.53
CAAC Writing	.27	.29	.35	.25	.29	.24	.27	.35
CAAC Music	.30	.35	.30	.27	.31	.25	.28	.42
CAAC Math-Sci	.27	.30	.16[a]	.10[b]	.13[c]	.21	.22	.30
CAAC Quality	.47	.44	.40	.35	.36	.33	.37	.57
Neuroticism	-.47	-.36	-.08[b]	-.27	-.12[d]	-.37	-.41	-.40

Note. CP-PC = Creative Personality-Potential Composite; CP-PCs = Creative Personality-Potential Composite Short Form; RIBS = Runco Ideational Behavior Scale; BFAS-T = Big Five Aspects Scales openness and intellect total score; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; SSCS = Short Scale of Creative Self; CPI = Creative Personal Identity; CSE = Creative Self Efficacy; CAAC Total = Creative Activity and Accomplishment Checklist total score; CAAC EC Total = Total of CAAC EC Crafts, PS, and Play scores; CAAC EC-Crafts = Everyday Creativity-Crafts; CAAC EC-PS = Everyday Creativity-Problem-Solving; CAAC EC-Play = Everyday Creativity-Play and Exploration; CAAC Writing = Writing and Language; CAAC Music = Music and Visual Arts; CAAC Math-Sci = Math and Science; CAAC Quality = Social Recognition for Creativity; Neuroticism = IPIP-NEO neuroticism scale scores.
Note. All p values < .001 unless otherwise noted.
[a] p = .002. [b] p = ns. [c] p = .013. [d] p = .02.

Table 4.9

Summary Table of Simultaneous Multiple Regression Models with Eight CP-PC Dimensions as Predictors (n = 368)

Variable	Awareness	Novelty	Complexity	Sensitivity	Nonconformity	Independence	Flexibility	Fluency
RIBS	+	+	+	--		--		+
BFAS-T	+		+	+			+	+
BFAS-I	+						+	
BFAS-O			+	+		--	+	+
SSCS								+
CPI					+			+
CSE	+		--					+
CAAC Total		+						+
CAAC EC Total		+						+
CAAC EC-Crafts				+				+
CAAC EC-PS		+						+
CAAC EC-Play		+						+
CAAC Writing			+		+			+
CAAC Music					+			+
CAAC Math-Sci		+		--				+
CAAC Quality					+			+
Neuroticism	--		+			--		--

Note. A + sign denotes a statistically significant positive correlation between the CP-PC dimension and variables when controlling for all other CP-PC dimensions in a multiple regression model. Two dashes denote a statistically significant negative relationship between CP-PC dimension and the variable when controlling for all other CP-PC dimensions in a multiple regression model.

Table 4.10

Simultaneous Multiple Regressions with Eight CP-PC Dimensions as Predictors (n = 368)

Variable	*B*	*SE*	β	*sr*
Ideational Behavior				
(intercept)	3.50	4.61		
Awareness	.61	.12	.27***	.14
Novelty	.72	.16	.23***	.13
Complexity	.97	.19	.21***	.15
Sensitivity	-.79	.20	-.14***	-.11
Non-conformity	.44	.26	.06	.05
Independence	-.58	.26	-.09*	-.06
Flexibility	-.07	.29	-.01	-.01
Fluency	1.85	.25	.38***	.21
R^2		.72		
F		113.75***		
BFAS-T				
(intercept)	17.12***	2.79		
Awareness	.26	.07	.20**	.10
Novelty	-.06	.10	-.03	-.02
Complexity	.53	.11	.20***	.14
Sensitivity	.54	.19	.17***	.13
Non-conformity	.04	.16	.01	.01
Independence	-.14	.16	-.04	-.03
Flexibility	.98	.17	.26***	.17
Fluency	.64	.15	.23***	.13
R^2		.69		
F		100.61***		
BFAS-I				
(intercept)	8.42***	1.89		
Awareness	.29	.05	.40***	.21
Novelty	-.01	.06	-.01	-.00
Complexity	.041	.07	.03	.02
Sensitivity	-.11	.08	-.06	-.05
Non-conformity	-.10	.11	-.04	-.04
Independence	.19	.11	.09	.06
Flexibility	.65	.12	.32***	.20
Fluency	.09	.10	.06	.03
R^2		.53		
F		51.37***		
BFAS-O				
(intercept)	8.70***	1.80		
Awareness	-.03	.05	-.04	-.02
Novelty	-.06	.06	-.05	-.03
Complexity	.48	.07	.31***	.22

Table 4.10 (Continued)

Sensitivity	.64	.08	.34***	.27
Non-conformity	.14	.10	.06	.05
Independence	-.33	.10	-.14**	-.10
Flexibility	.33	.11	.15**	.09
Fluency	.55	.09	.33***	.18
R^2		.65		
F		81.61***		
SSCS				
(intercept)	4.38*	1.98		
Awareness	.10	.05	.10	.05
Novelty	.07	.07	.05	.03
Complexity	-.05	.08	-.02	-.02
Sensitivity	.02	.08	.01	.01
Non-conformity	.21	.11	.06	.05
Independence	-.03	.11	-.01	-.01
Flexibility	-.02	.12	-.01	-.00
Fluency	1.66	.10	.75***	.42
R^2		.76		
F		140.62***		
Creative Personal Identity				
(intercept)	1.12	1.17		
Awareness	-.02	.03	-.03	-.01
Novelty	-.01	.04	-.01	-.01
Complexity	.07	.04	.06	.04
Sensitivity	.07	.05	.05	.04
Non-conformity	.15	.07	.08*	.07
Independence	-.08	.07	-.05	-.04
Flexibility	-.04	.07	-.02	-.02
Fluency	.95	.06	.80***	.44
R^2		.71		
F		107.07***		
Creative Self-efficacy				
(intercept)	3.25	1.12		
Awareness	.12	.03	.22***	.11
Novelty	.07	.04	.10	.06
Complexity	-.12	.04	-.11**	-.08
Sensitivity	-.06	.05	-.05	-.04
Non-conformity	.06	.06	.03	.03
Independence	.05	.06	.03	.02
Flexibility	.02	.07	.01	.01
Fluency	.72	.06	.63***	.35
R^2		.70		
F		106.30***		

Table 4.10 (Continued)

Neuroticism				
(intercept)	3.25**	1.12		
Awareness	-.32	.09	-.30***	.11
Novelty	-.20	.12	-.13	.06
Complexity	.87	.13	.40***	-.08
Sensitivity	.02	.14	.01	-.04
Non-conformity	.32	.19	.09	.03
Independence	-.42	.19	-.13*	.02
Flexibility	-.57	.21	-.19**	.01
Fluency	-.39	.18	-.17*	.35
R^2		.34		
F		22.59***		
CAAC Total				
(intercept)	-14.43*	6.50		
Awareness	.02	.17	.01	.00
Novelty	.59	.22	.19**	.11
Complexity	.10	.26	.02	.02
Sensitivity	.10	.27	.02	.02
Non-conformity	.54	.36	.08	.06
Independence	.13	.36	.02	.01
Flexibility	-.13	.40	-.02	-.01
Fluency	1.77	.34	.39***	.22
R^2		.38		
F		27.41***		
CAAC EC-Total				
(intercept)	-4.76	3.60		
Awareness	.09	.10	.08	.04
Novelty	.44	.12	.26***	.15
Complexity	-.01	.14	-.00	-.00
Sensitivity	.06	.15	.02	.02
Non-conformity	.12	.20	.03	.03
Independence	.04	.20	.01	.01
Flexibility	-.12	.22	-.04	-.02
Fluency	.77	.19	.31***	.17
R^2		.36		
ΔF		25.34***		
CAAC EC-Crafts				
(intercept)	-2.21	1.57		
Awareness	.00	.04	.00	.00
Novelty	.08	.05	.12	.07
Complexity	-.02	.06	-.02	-.02
Sensitivity	.15	.07	.14*	.11
Non-conformity	.06	.09	.04	.03
Independence	-.03	.09	-.02	-.02

Table 4.10 (Continued)

	Flexibility	-.10	.10	-.07	-.05
	Fluency	.36	.08	.36***	.20
R^2			.24		
F			14.51***		
CAAC EC-Problem-solving					
	(intercept)	1.36	1.44		
	Awareness	.06	.04	.13	.07
	Novelty	.18	.05	.28***	.16
	Complexity	.04	.06	.04	.03
	Sensitivity	-.16	.06	-.15*	-.12
	Non-conformity	-.04	.08	-.04	-.02
	Independence	.08	.08	.06	.04
	Flexibility	-.01	.09	-.00	-.00
	Fluency	.19	.08	.21*	.11
R^2			.30		
F			18.74***		
CAAC EC-Play and Exploration					
	(intercept)	-3.92**	1.36		
	Awareness	.03	.04	.07	.04
	Novelty	.17	.05	.28***	.16
	Complexity	-.02	.05	-.03	-.02
	Sensitivity	.07	.06	.06	.05
	Non-conformity	.11	.08	.08	.06
	Independence	-.01	.08	-.01	-.00
	Flexibility	-.02	.08	-.01	-.01
	Fluency	.21	.07	.23*	.13
R^2			.34		
F			22.61***		
CAAC Writing and Language					
	(intercept)	-3.14*	1.34		
	Awareness	-.05	.04	-.13	-.07
	Novelty	-.03	.05	-.05	-.03
	Complexity	.15	.05	.19**	.13
	Sensitivity	.07	.06	.07	.06
	Non-conformity	.16	.07	.12*	.10
	Independence	.04	.07	.03	.02
	Flexibility	.06	.08	.05	.03
	Fluency	.18	.07	.22*	.12
R^2			.17		
ΔF			9.10***		
CAAC Music and Visual Arts					
	(intercept)	-2.97	1.55		
	Awareness	-.07	.04	-.16	-.08
	Novelty	.05	.05	.07	.04

Table 4.10 (Continued)

	Complexity	.02	.06	.02	.01
	Sensitivity	.08	.07	.07	.06
	Non-conformity	.22	.09	.15*	.12
	Independence	.01	.09	.01	.01
	Flexibility	.00	.10	.00	.00
	Fluency	.35	.08	.37***	.20
R2			.19		
F			11.48***		
CAAC Math and Science					
	(intercept)	-.40	1.44		
	Awareness	.04	.04	.09	.05
	Novelty	.12	.05	.22*	.13
	Complexity	-.08	.06	-.10	-.07
	Sensitivity	-.13	.06	-.13*	-.10
	Non-conformity	-.06	.08	-.05	-.04
	Independence	.04	.08	.04	.03
	Flexibility	-.04	.09	-.04	-.02
	Fluency	.120	.08	.23**	.13
R^2			.13		
F			6.40***		
CAAC Quality					
	(intercept)	-3.15***	.87		
	Awareness	.01	.02	.02	.01
	Novelty	.01	.03	.03	.02
	Complexity	.02	.03	.04	.03
	Sensitivity	.02	.03	.03	.02
	Non-conformity	.11	.05	.12*	.10
	Independence	-.01	.05	-.01	-.01
	Flexibility	-.03	.05	-.03	-.02
	Fluency	.28	.05	.47***	.26
R^2			.34		
F			23.22***		

Note. BFAS-T = Big Five Aspects Scales openness and intellect total score; BFAS-I = Big Five Aspects Scales intellect aspect of openness to experience; BFAS-O = Big Five Aspects Scales openness aspect of openness to experience; SSCS = Short Scale of Creative Self; CAAC Total = Creative Activity and Accomplishment Checklist total score; CAAC EC Total = Total of CAAC EC Crafts, PS, and Play scores; CAAC EC-Crafts = Everyday Creativity-Crafts; CAAC EC-PS = Everyday Creativity-Problem-Solving; CAAC EC-Play = Everyday Creativity-Play and Exploration; Neuroticism = IPIP-NEO-60 neuroticism scale scores. *sr* = semi-partial correlation; a statistically significant standardized regression coefficient indicates that the semi-partial correlation is statistically significant as well.
*p < .05. **p < .01. ***p < .001.

Table 4.11

Test of Conditional Effect of CP-PC on Creative Behavior (n = 368)

Variable	*B*	*SE*	*p*	*95% CI for B*	
(intercept)	5.45	16.01	.74	-22.23	32.21
CP-PC	.01	.10	.93	-.17	.19
CSE	-.06	.76	.94	-1.39	1.31
CP-PC x CSE	.01*	.00	.03	.001	.02
R^2			.40***		
ΔR^2			.01*		

Note. CP-PC = Creative Personality-Potential Composite; CSE = creative self-efficacy.
*$p < .05$. ***$p < .001$.

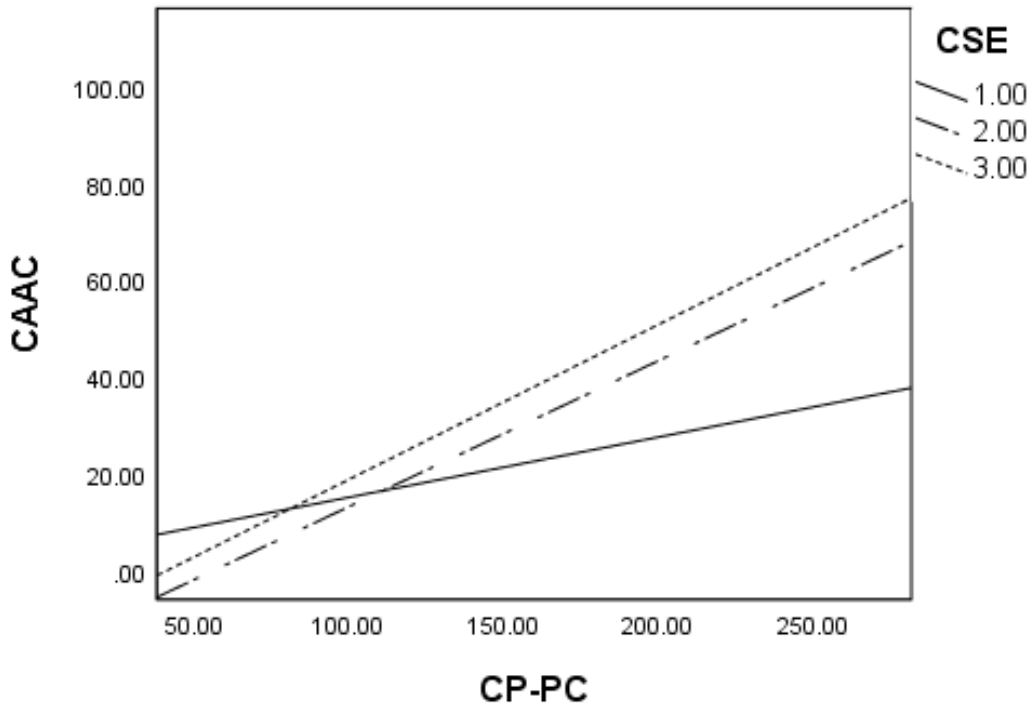

Figure 4A. Visual representation of statistically significant moderation results for the relationship between trait-based creative potential and creative behavior at low (1.00), moderate (2.00), and high (3.00) levels of creative self-efficacy, indicating that the relationship between creative potential and creative behavior is stronger when CSE is moderate to high.

Appendix 4A

Creative Personality-Potential Composite (CP-PC)

Shepard, 2019

Instructions. Now, you will see 43 descriptors that may or may not fit with how you see yourself. Consider how well each of these describes who you are. This might be different from your actual behavior in some situations. That is okay, just select the response that you think best describes your truest self. Please select an answer for each question, even if you need to approximate.

Please rate the extent to which each of the following describe who you are:[1]

1. Different. You are not like most other people.

***2. Creative.** You think or act in a creative fashion.

***3. A Nonconformist.** You are not afraid to ruffle some feathers, to go against what the crowd is doing.

4. Authentic. You are genuine, real, true to yourself.

5. Perceptive. You notice things. Details that others miss are obvious to you.

6. Adaptive. You change how you think or behave based on new information or experiences.

7. Complex. There are many different sides to who you are.

***8. Fluid.** You do not fit into stereotypes or social prescriptions of being one thing or another.

***9. Connected.** You respond strongly to things like music, art, and nature.

10. In-tune. You sense when something is wrong or could be improved.

[1]When an item number is preceded by an asterisk, that item is also part of the short-form of the measure (CP-PCs).

***11. Self-directed.** Even if there is a set way of doing something, you are likely to question or modify it.

***12. A Divergent Thinker**. Your thought process goes in many different directions

***13. An Explorer.** You try or consider many ways of doing things.

***14. Open**. You are willing to consider strange or unique ideas or courses of action.

***15. Curious.** You engross yourself in new information, activities, or hobbies.

16. Playful. You enjoy banter, cleverness, and life being game-like.

***17. Imaginative.** You think of lots of new ideas and possibilities.

***18. Integrative**. You find connections between different ideas and concepts, even if they don't seem related at first.

***19. Inspired.** You can find inspiration everywhere, even in everyday things.

20. Thoughtful. You try to understand how things have been done before, so that you can improve upon them.

***21. Aware.** You can identify solutions for problems that haven't been figured out.

***22. Passionate.** When a topic or activity grabs your interest, you dive deeply into learning about it or doing it.

23. Independent. You prefer to disregard rules that don't make much sense.

24. Accepting. You are comfortable around people who others think are different or strange.

***25. Autonomous.** You enjoy doing things your own way, figuring out your own path.

***26. Full of Ideas.** You have so many ideas it sometimes feels like your ideas have ideas.

***27. Childlike.** You ask a lot of questions, and don't take initial explanations for granted.

***28. Multifaceted.** You can be different things at the same time - happy and sad, reckless and calculated...

***29. Adventurous.** You like the idea of exploring the unfamiliar.

***30. Boundary-breaking.** You enjoy pushing boundaries in what you do.

***31. A Noticer.** You pay attention to the unexpected - things that are surprising, novel, unique.

***32. Evolving.** You actively look for ways to learn and grow.

***33. Broad-minded.** You enjoy solving problems with multiple possible answers more than those with just one correct answer.

***34. Unconventional.** You think of new ways to do things, like use words or change your appearance.

***35. Sensitive.** You are moved by the beauty or tragedy in things you encounter.

36. A Daydreamer. You regularly get lost in thoughts and reflection.

37. Psychologically-minded. You explore connections, patterns, and deeper meanings.

***38. A Unique Thinker.** Others find your ideas surprising, but to you they seem obvious.

***39. Divergent.** You easily think of multiple perspectives from which to view problems or situations.

***40. An Improver.** You see ways to make others' ideas better.

41. Interested. You like to learn about many different topics, from watch-making to marine biology.

42. Empathetic. It is easy for you to feel the pain and joy of others.

43. A Novelty Seeker. You get restless always doing the same old thing.

Scale anchors: (1) Not at all like me **(2)** Somewhat unlike me **(3)** A little unlike me **(4)** A little like me **(5)** Somewhat like me **(6)** Exactly like me

CHAPTER 5

HOW IS TRAIT-BASED CREATIVE POTENTIAL RELATED TO EXTRAVERSION, AGREEABLENESS, AND CONSCIENTIOUSNESS?: AN EMPIRICAL INVESTIGATION AND ADDITIONAL VALIDATION STUDY OF THE CREATIVE PERSONALITY-POTENTIAL COMPOSITE

[1]Shepard, Aubra. To be submitted to the Journal of Creative Behavior.

Abstract

Past research focused on measures of creativity has indicated that that different creativity constructs may evidence varied relationships with five factor model (FFM) traits and similar higher-order trait conceptualizations. This has appeared to be increasingly true as the degree of specificity of the examination of constructs increases (e.g., *components* of divergent thinking, or *facets* of FFM traits). Accordingly, this study investigated the relationship between the Creative Personality-Potential Composite (CP-PC) and its dimensions and the FFM traits of agreeableness, extraversion, and conscientiousness and their facets (*n* = 655*)*. Eight dimensions of the CP-PC were identified in a previous study, using exploratory factor analysis. The present study focused on confirming these dimensions by comparing several factor models (a one-factor model, and eight factor model, a model with a hierarchical structure, and a model with a bi-factor structure) based on the results of the previous study. However, there were issues with model fit, and it appears that a model that incorporates cross-loadings may be most appropriate, pending further research. In spite of a lack of clarity regarding a stable factor structure, CP-PC dimensions did show differential predictive ability of the other trait constructs. Possible reasons for the lack of clear factor structure are explored, and directions for future research are discussed.

Introduction

There have been some inconsistencies regarding the extent to which traits from the five-factor model of personality (FFM; McCrae & Costa, 1987) have been related to various indices of creativity (Furnham, 2017). The FFM is comprised of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. It is one of the most commonly used frameworks for the conceptualization of personality, and these traits have been found to predict important life outcomes, including well-being and psychopathology (Maples-Keller,

Williamson, Sleep, Carter, Campbell, & Miller, 2019). Openness to experience includes tendencies toward curiosity, imagination, and broad interests. Conscientiousness is denoted by traits such as self-discipline, goal-directed behavior, and striving toward achievement. Individuals who are extroverted tend to be more sociable, sensation-seeking, and active. Agreeable individuals tend to be more trusting, empathetic, and cooperative. Trait-neuroticism reflects dispositions toward emotional instability, as indicated by higher levels of sensitivity to distress, frequent worry, or irrational self-referent thoughts (McCrae & Costa, 1997).

Trait openness to experience has tended to show the strongest and most consistent relationships with creativity-specific variables, including but not limited to divergent thinking, a range of domain-specific creative behaviors, and creative achievement (Silvia, Nusbaum, Berg, Martin, & O'Connor, 2009). Extraversion has typically evidenced a consistent pattern of positive relationships as well, though the magnitude of these relationships tends to be smaller than those of creativity with openness (Batey, Chamorro-Premuzic, & Furnham, 2010; Karwowski, Lebuda, Wisniewska, & Gralewski, 2014; Kaufman et al., 2014; King, Walker, & Broyles; 1996; Puryear, Kettler, & Rinn, 2017). The remaining three FFM factor traits of agreeableness, conscientious, and neuroticism have been found to have less consistent relationships with variables pertaining to creativity; the direction, magnitude, and statistical significance of these relationships may be more heavily dependent on the domain of creativity examined, the outcome variable of interest, or even the sample of research participants (Batey & Furnham, 2006; Batey, Silvia, Furnham, & Safiullina, 2010; Feist, 1998, 1999; Karwowski et al., 2013; Kaufman et al., 2014; McCrae, 1987; Silvia et al., 2009; Wolfradt & Pretz, 2001). This appears, to some extent, to be true of extraversion as well, but again to a lesser degree.

The research literature provides several illustrative examples of how creativity, in its varied forms, is related to personality. Silvia et al. (2009) found that the relationship between empathetic-interpersonal creativity and conscientiousness was statistically significant and positive, while the relationships between conscientiousness and a number of other creativity variables examined varied in terms of the sign of the effect and were not statistically significant. In another study, conscientiousness and agreeableness were both negatively related to ideational behavior, while openness to experience and extraversion were positive predictors (Batey et al., 2010). von Stumm, Chung, and Furnham (2011) found that individuals with a high level of creative achievement tended to score higher in both openness and extraversion, while Feist (1998) found that creative artists and scientists tended to be more introverted, with creative artists, but not scientists, also being characterized by a higher degree of neuroticism. Both groups tended to be low in agreeableness, though in different ways. In a review of 96 studies, Puryear et al. (2017) found that openness was positively and most strongly related to creativity variables in general, followed by extraversion, agreeableness, and conscientiousness. Neuroticism was negatively related, but the weighted mean correlation was quite small (r = - .04). These relationships again varied based on the creativity construct analyzed. For example, conscientiousness was positively predictive of measures of creative production, but negatively related to measures of creative potential. Neuroticism was unrelated to creative potential, negatively associated with creative production, and positively related to the flexibility and elaboration components of divergent thinking. Agreeableness was positively related to fluency scores on divergent thinking tasks, but negatively related to the originality of responses.

There has also been evidence of paradoxical relationships of *facets* within FFM traits to indices of creativity, and so investigation at the facet level is relevant when considering

relationships between personality traits and creativity measures (King et al., 1996; Silvia et al., 2010). Higher order trait-conceptualizations may obscure relationships between independent and dependent variables which may be apparent when narrower conceptualizations are considered. The issue of paradoxical patterns of traits predicting creative behavior has long been noted in creativity research, by individuals such as Barron (1957), Csikszentmihalyi (2013), and Fürst and Lubart (2017). von Strumm et al. (2011) also noted that "The extreme diversity of creativity and its measures...evidently complicates a thorough understanding of personality's effects on this phenomenon." (p. 113).

Taken together, the body of research so far reviewed indicates that it is likely of benefit to verify whether and to what extent a new creativity measure is related to a given personality trait, and also whether investigations at narrower conceptual levels provide additional information. The Creative Personality Potential Composite (CP-PC) is a measure of trait-based creative potential that was previously validated in two studies (Shepard, 2019). This instrument asks respondents to indicate the extent to which 43 traits describe who they are. Items, measure instructions, and scale anchors were primarily designed to measure trait-based creative potential, including that which has not been expressed in the form of overt behavior. Sufficient reliability as evidenced by a Cronbach's alpha value of .96, was indicated. Scores of trait-based creative potential were moderately to strongly related to ideational behavior, two conceptualizations of openness to experience, creative self-concept, three domains of everyday creative activity and accomplishment, and creative activity and accomplishment in writing and language, music and visual arts, and math and science. Scores were also positively predictive of the quality of creative activity and accomplishment. Trait-based creative potential was negatively related to neuroticism

to a moderate degree, though neuroticism did not moderate the relationship between creative potential and creative behavior. Creative self-efficacy did moderate this relationship.

Exploratory factor analyses supported possible one or eight factor solutions, depending on whether the model was rotated (factors were allowed to correlate for the rotation). The structure matrix of the eight-factor solution (using maximum likelihood extraction and a promax rotation) indicated a possible hierarchical or bifactor structure including a secondary or general factor, given that many of the items displayed a number of cross-loadings, while the pattern matrix indicated that there appeared to be unique factor loadings for almost all of the items. The eight dimensions identified from the rotated solution are listed and explained in Table 5.1. Correlations between the eight factors ranged from weak to strong, with the weakest relationship being between the factors representing nonconformity and sensitivity, and the strongest between the factors representing awareness and fluency. In simultaneous regression models with the eight CP-PC dimensions entered, the various outcome variables in the study (as listed above) were differentially predicted by sum scores for the eight factors. This appeared to support the utility of factor-based subscales for the CP-PC.

The Present Study

The purpose of the present study is two-fold. The first aim is to test the fit of confirmatory factor models based on previous investigations of the CP-PC (Shepard, 2019) and further explore the psychometric properties of the CP-PC. As was the case with the CP-PC, it is common for psychological measures to appear to be consistent with both uni- and multi-dimensional structures, and so further investigation can be useful (Reise, Moore, & Haviland, 2010). Reise et. al described four general types of dimensional factor models relevant to personality research: unidimensional models, in which data are best represented by a single

factor contributing common variance to item responses, correlated traits models, in which multiple, related latent factors each contribute variance to a specific subset of items, second order factor models, in which a general latent trait is responsible for variance shared by lower order factors, which in turn contribute variance to responses in corresponding item sets, and bifactor models, in which both a general factor and a set of specific factors contribute to responses to all items or item sets, respectively. In this last case, variance in the general factor is not modeled as contributing variance to the specific factors (in contrast to the hierarchical model), and so bifactor solutions are orthogonal. Instead, the general factor and specific (group) factors are each responsible for variance in items independently. Each of the four models were tested in the present study. Based on the results of Shepard (2019), there is evidence that a one-factor solution may be ideal; the total measure score predicted variables indicative of construct and criterion-related validity moderately to strongly. Furthermore, most items had their strongest loading on the first factor in the unrotated eight-factor solution. However, a correlated eight-factor solution is also reasonable, given that the factors indicated by the rotated solution were interpretable, theoretically supported, and weakly to strongly correlated with each of the other factors. It is also reasonable that shared variance between the eight factors is due to a second-order factor that reflects the broader construct of creative potential. Finally, it is also reasonable that specific factors and a general (creative potential) factor contribute variance to item responses. In studies of creativity, there has been evidence for both domain generality and domain specificity, in that there are ways in which resources for creativity appear to contribute to the potential to think, behave, or interpret things creatively in general, but may also be better for creative development in specific domains (Barbot, Besançon, & Lubart, 2016).

The second aim of the present study is to continue to explore the relationship between the CP-PC, its dimensions, and FFM traits and their facets. Specifically, the FFM traits not measured in previous validation studies (reported in Shepard, 2019) will be examined: agreeableness, extraversion, and conscientiousness.

Method

Sample

All data were collected via an online survey platform, and convenience/snow-ball sampling was utilized for data collection. The study description and a link to the survey were shared across a number of social media platforms and email listservs both by this researcher and by others who had varied networks specific to demographic variables such as age, ethnicity, geographical location, political or religious affiliation, and field of employment. Participants were encouraged to share the survey with others in their own personal or professional networks, and based on information viewable on the social media posts, this was done regularly.

Over a period of approximately two months, 792 individuals accessed the survey. Of these individuals, 33 viewed the consent form but did not complete any survey items. Seventy-one participants completed demographic items but did not continue their participation, so were excluded from all analyses. Although this left 688 participants, 13 did not respond to an attention check item (meant to ascertain that participants were carefully reading each question and not responding randomly), and 20 provided an incorrect response to the attention check. These individuals were also excluded from subsequent analyses. Thus, the final sample consisted of 655 participants. The data were then examined for univariate and multivariate outliers, as well as the presence of cases that might exert undue leverage. Preliminary regression analyses were

conducted with and without these cases, and it did not appear that including them altered results to a notable degree. As such, all 655 responses were retained.

Respondents indicated that their sex was female (*n* = 540), male (*n* = 104), or other (*n* = 6). Five respondents indicated that they preferred not to answer. Respondent ages ranged from 18 to 81 (*M* = 44.52, *SD* = 14.80), though three participants did not provide a response to this item. Four percent of survey participants had completed some high school, high school, or a technical certification (*n* = 26), 38.3% (*n* = 250) had completed some college or an associates or bachelor's degree, and 57.9% (*n* = 379) had completed a graduate-level college degree.

In terms of ethnicity, 87.2% (*n* = 571) of respondents identified as White, 2.6% (*n* = 17) as Black or African American, 2.4% (*n* = 16) as being of Hispanic, Latino/a, or Spanish origin, 2.1% (*n* = 14) as a member of more than one group listed, 2.1% (*n* = 14) as Asian, .5% (*n* = 3) as Native Hawaiian or other Pacific Islander, and .3% (*n* = 2) as American Indian or Alaskan Native. 1.1% (*n* = 7) indicated that the correct response option was not provided, and 1.7% (*n* = 11) preferred not to answer. Respondents were located in a variety of geographical areas: 91.8% (*n* = 601) in the United States, 1.5% (*n* = 10) in Finland, 1.2% (*n* = 8) in the United Kingdom, 1.1% (*n* = 7) in Canada, .7% (*n* = 5) in Australia, .6% (*n* = 4) in Ireland, .3% (*n* = 2 each) in South Africa or Portugal, and .2% (*n* = 1 each) in Belarus, Brazil, Croatia, England, Germany, India, Italy, Malaysia, Mexico, Nepal, the Netherlands, Poland, Saudi Arabia, Switzerland, or Trinidad and Tobago. One individual did not provide their location. All participants answered affirmatively to a question asking whether they were fluent in English. Due to the diversity of participant location, a regression analysis was completed to examine whether there was a relationship between CP-PC scores and whether participants were located in or outside of the United States. This analysis produced a non-statistically significant relationship, and the Pearson

correlation coefficient was small (r = -.10, p = .805; participants located in the United States coded 0, all other participants coded 1).

Measures

Creative Personality-Potential Composite The same 43-item version of the CP-PC as administered in an earlier study (Shepard, 2019) was used in this study. Because item-total correlations, factor loadings, and communalities were all mostly sufficient in the previous study, all items were retained for further testing. Each item begins with a descriptor, presented in bold text, which is followed by a brief explanation. Respondents are asked to indicate the extent to which each item reflects their truest selves, even if they do not always behave in a manner consistent with the item. This was an attempt to measure the traits relatively free of context effects (for a more detailed explanation, please see Shepard, 2019). Response options are presented on a 6-point Likert scale, and range from *not at all like me - exactly like me*. A total score is calculated by adding the scores from all of the items. Subscale scores are calculated by adding item scores within each of the eight subscales. No items are reverse-scored.

International Personality Item Pool Representation of the NEO-PI (IPIP-NEO-60; Maples-Keller et al., 2019). The IPIP-NEO-60 was developed using items from the International Personality Item Pool and contains items that represent each trait from the five-factor model of personality. Arguments for reliability and validity were supported in its validation study. In the present study, three of the five scales were used: agreeableness, extraversion, and conscientiousness. Each scale has 12 items representing six facets for the given construct. The facets for agreeableness are trust, morality, altruism, cooperation, modesty, and sympathy. The extraversion scale is comprised of items that reflect friendliness, gregariousness, assertiveness, activity level, excitement-seeking, and cheerfulness. Conscientiousness is

conceptualized as self-efficacy, orderliness, dutifulness, achievement striving, self-discipline, and cautiousness. Six items on the agreeableness scale are reverse-scored, as is one on the extraversion scale and five on the conscientiousness scale. Sample items include “I seek adventure” and “I work hard.” Scale scores and facet scores were calculated for the three scales and 18 subscales.

Procedure

Potential respondents viewed a short description of the study in the various social media posts or emails. Upon clicking the survey link, they were redirected to the online survey platform, where they viewed the informed consent document. Very brief general instructions were provided on the next page of the survey. These instructions read: “You will now see three pages of questions. Please answer each question to the best of your ability. It is okay if you need to approximate. Remember, your individual answers will not be shared with anyone.” The following page contained the demographic items, the next the CP-PC items, and the final page the items from the IPIP-NEO-60, for a total of 84 items. Respondents did not receive compensation for their participation.

Results

As noted above, five participants did not indicate their sex, and three participants did not indicate their age. As such, these participants were excluded from analyses that involved those specific variables. One participant failed to answer a CP-PC item; as it was only one item and one participant, the average score from the CP-PC subscale (as determined by the prior validation study) was used for the missing value. One participant failed to provide an answer to an item on the cautiousness subscale of conscientiousness; because the subscales only have two items each, this participant’s data was not included for these variables (the total

conscientiousness scale and the cautiousness subscale). There were no other data missing for the variables analyzed.

Cronbach's alpha values for the study measures were sufficient and are reported in Table 5.2 with measure mean values. Based on the sample size, skew and kurtosis values fell within an acceptable range (Kim, 2013), with the largest absolute skew value being for the morality scale of agreeableness (-1.93) and the largest kurtosis value also being for morality (3.67). Bivariate correlations between measures are reported after the factor analysis results so that they are presented in light of modified CP-PC items and factors.

Factor Analyses

First, discriminant validity of the CP-PC items was checked using an exploratory factor analysis with maximum likelihood estimation and an orthogonal (varimax) rotation including all of the personality items in the study. The factor number was set to four, given that there were four trait variables. All CP-PC items loaded most strongly on the first factor, aside from three: item 4 (authentic), item 35 (sensitive), and item 42 (empathetic). Item 4 loaded with conscientiousness items and 35 and 42 loaded on a factor with agreeableness items. Item means and corrected item-total correlations for the present study, as well as the same information and factor loadings from the earlier validation study were examined to determine possible benefits and drawbacks of retaining these items. Authentic had a low factor loading in the previous study, as well as a high mean and low item-total correlation in the previous study and the present study. This seemed to indicate both subpar discriminant and convergent validity and so this item was removed from the CP-PC measure. Although the other two items had only slightly lower means and higher inter-item correlations, they had excellent loadings on a sensitivity factor in the prior validation study. Because such items may especially reflect potential for creativity that is

interpersonal, emotional, or artistic in nature (e.g., Feist, 1998, 1998; Kerr & Vuyk, 2013), these items were retained at this stage. All other items on the CP-PC had primary loadings on the first factor of the EFA, indicating sufficient discriminant validity from the other trait constructs in the study.

Next, a series of confirmatory factor analyses was conducted using the Lavaan (latent variable analyses) package (version .6-5) in RStudio. Mardia's test of multivariate normality (executed with the MVN package in RStudio) indicated that the data deviated from a multivariate normal distribution, and so maximum likelihood estimation with robust standard errors and a Satorra-Bentler scaled test statistic were used. Scales for the latent variables were set by constraining the loading of the first indicator of each factor to one, as is the default for the lavaan package. All CP-PC items from Shepard (2019) were included in the initial analyses, aside from item 4 (authentic) which was removed for reasons already discussed. The eight factors for the CP-PC, when used in these analyses, were created based on the item loadings from the pattern matrix for the eight-factor solution using maximum likelihood extraction and a promax rotation (reported in Shepard, 2019).

Four models were fitted: a one-factor model using all CP-PC items on the same factor, an eight-factor correlated traits model, a bifactor model with a general factor and eight specific factors, and a hierarchical model with a creative potential as the highest order factor, under which the eight factors were subsumed. However, none of the models had a consistent pattern of acceptable fit indices (see Table 5.3), and item 15 (curious) had a large negative variance in the bifactor model and so the solution was not interpretable. Cangur and Ercan (2015) have provided several recommendations regarding model fit statistics. First, the χ^2 test statistic, an indication of fit between the data and the hypothesized model, should be non-significant, though this

inferential test can be susceptible to sample size. The null hypothesis that the model reflects the data may be rejected as samples sizes increase and is usually significant when sample sizes are greater than 400. The ratio of the χ^2 value to degrees of freedom for the model is ideal when the value is less than 2 and acceptable when the value is less than 3. The Standardized Root Mean Square Residual (SRMR) value, which provides insight into the degree of correspondence of residual variance of the data covariance matrix and the hypothesized covariance matrix, is acceptable at values less than .10, but good fit is indicated at values less than .05. Root Mean Square Error of Approximation (RMSEA) values, which are determined by incorporating model degrees of freedom in the covariance matrix comparisons, lower than .5 are ideal, but those between .05 and .08 indicate acceptable fit. The Tucker Lewis Fit Index (TFI) and Comparative Fit Index (CFI) both compare the fit of the hypothesized model to a null model and can be influenced by the average correlation between indicators; if correlations are lower, TFI and CFI values will be lower as well (Kenney, 2015). TFI and CFI values are ideal if they are greater than .97 and .95. respectively (Cangur & Ercan, 2015).

Because it was reasonable, in the absence of a well-fitting hierarchical or bifactor structure, to think that multiple factors would, in *some* cases, contribute a notable degree of variance to some items but not others, a correlated traits model in which some items were modeled to cross-load on more than one factor was specified next. A number of researchers have posited the that interrelated structure of personality items indicates that modeling cross-loadings may be more appropriate and accurate than specifying hierarchical models (Ashton, Lee, Goldberg, & de Vries, 2009; Schimmack, 2019). Ashton et al. have gone as far as to note that absolute model fit indices are expected to be poor in hierarchical models, due to the failure of simple structure to adequately reflect the domain of personality. To aid in the aforementioned

direction shift in the present study, a more exploratory approach was undertaken. The items were first modeled in an eight-factor EFA with a promax rotation in the SPSS software, which allowed factor loadings and factor variances to be unconstrained. Several items with low communalities (<. 30) were identified and so the subsequent models were tested with and without them (item 6: adaptable, item 16: playful, item 22: passionate, and item 24: accepting; ultimately only item 16 was retained). Patterns of cross-loadings were examined in the structure matrix of the SPSS model output, as were cross-loadings in the Shepard (2019) study. A theoretical or empirical rationale for including (or not including) each cross-loading was also considered. An initial cross-loaded model showed much better fit. However, due to concerns with over-fitting, results being sample-specific, and the potential for Type 1 error, the model was also tested using the dataset from the previous study (Shepard, 2019). This analysis indicated that three cross-modeled items were negatively correlated with the secondary or tertiary factors, so these were removed. A number of the cross-loadings did not reach statistical significance with the Shepard (2019) data; these items were retained or removed from secondary or tertiary factors based on the strength of the theoretical rationale for keeping them, especially given that the sample size was smaller in the prior study (n = 386), and thus there was a lower level of power to detect small effects. There were several cases in which the standardized factor-loadings in the final cross-loaded model (please see Table 5.4) indicated that an item might fit better on a factor other than the one that it was originally placed on in the Shepard (2019) study. To resolve the discrepancies, several approaches were taken. First, the results of the rotated eight-factor EFA for the Shepard (2019) study were revisited, as many items in that study had cross-loadings according to the structure matrix and a few had relatively similar loadings based on the pattern matrix. Additionally, items were modeled in one-factor models with the primary items for the corresponding two factors,

then removed to see how the other item loadings for the factor changed. The loadings for the target items on each of the factors were also compared. These last two processes were conducted with both the present dataset and the dataset from the earlier study (Shepard, 2019). Ultimately, the theoretical rationale for an item's original placement was used to make the final decision, with the other information being considered. For example, although items 13 (an explorer) and 33 (broad-minded) had higher loadings on the awareness factor than the novelty factor, they were unique in that they both addressed a tendency toward a preference for novelty (e.g., considering new ways of doing things or enjoying solving problems that do not have a tried and true solution).

As a result of the aforementioned process, two items were moved to different subscales. Item 37 (psychologically-minded) was moved from the awareness to the complexity factor scale, as it seemed to be a slightly better indicator of cognitive or personal complexity than problem or self-awareness since the item description refers to a tendency to recognize patterns, dig deeper, and explore how ideas or other phenomena are connected. Second, item 32 (evolving) was moved from the awareness factor to the flexibility factor. It was similar in quality to the *adaptive* item that was removed from the flexibility factor but had a better fit with the overall model than the adaptive item did. The item loading on both of the factors (with only the primary items included) was nearly the same in both datasets (this may have, in part, resulted from the removal of the item *authentic* from the awareness factor earlier on). Given the move for item 32, the primary awareness factor is now reflective of individual differences in problem-awareness, as opposed to self- *or* problem-awareness.

The Cronbach's alpha values for the eight CP-PC dimensions for the present sample (with only the primary items for each factor scale included), in light of the modifications, are as

follows: .83 (awareness), .81 (novelty), .72 (complexity), .65 (sensitivity), .58 (non-conformity), .68 (independence), .71 (flexibility), and .79 (fluency). In the final model, which incorporated the cross-loadings, all of the factors evidenced significant, positive covariance with the others ($p <$ .05), aside from sensitivity and non-conformity; the covariance was positive but not significant ($p = .50$). This is consistent with the results of previous validation study (Shepard, 2019), given that these two factors were found to be the most weakly correlated ($r = .12$). The modified CP-PC measure can be viewed in Appendix 5A.

Regression Analyses

A series of regression analyses was also conducted. For these analyses, scores for the CP-PC, CP-PCs (the short-form version of the measure) and CP-PC factor scores were calculated based on the modifications to the CP-PC discussed in the prior section (i.e. the removal of four items and the moving of two items to different primary factors). Unless noted, the modified long-form CP-PC was used in analyses; it was also used to calculate the factor scores. For simplicity's sake, and because it is the most straightforward way to use the measure in applied settings, only the primary items for each factor (not the cross-loaded items) were used to calculate factor scores for each CP-PC dimension; item scores were added together and were not weighted in any way. Potential issues with collinearity, as indicated by Tolerance and VIF values, were explored for all of the predictor sets in the subsequent regressions. No problems were indicated.

Bivariate correlations between the primary study measures can be viewed in Table 5.5. Mirroring the overall pattern of correlation strength found for creativity measures and FFM traits in Puryear et al. (2017), the CP-PC had the strongest correlation with extraversion ($r = .30$, $p <$ .001) and was not statistically related to agreeableness ($r = .07$, $p = .062$) or conscientiousness ($r = -.03$, $p = .503$). Contrary to the results of the validation study reported in Shepard (2019), CP-

PC scores were related to age, sharing 2.4% common variance (r = .16, p < .001). Because few participants reported their sex as being other than male or female or chose the option indicated that they preferred not to respond to the item, only male and female sex-specific that variables were analyzed in a regression with CP-PC scores. Consistent with the results of Shepard (2019), there was not a significant relationship between sex and CP-PC scores (r = .01, p = .734; men coded 0, women coded 1). But, the mean scores by group are interesting. The means and standard deviations for men (M = 182.01, SD = 24.54) and women (M = 182.91, SD = 24.86) were almost exactly the same. However, means for individuals who did not identify as male or female (M = 194.40, SD = 29.16) or preferred not to answer (M = 197.97, SD = 19.51) were higher. With such small subgroups, the extent to which this occurred by chance cannot be ascertained, but the results could indicate interesting directions for future research.

Table 5.6 reports results of three simultaneous multiple regressions with total CP-PC scores entered as the outcome variable and each of the three sets of six FFM trait facets entered separately as predictors. These analyses allowed for a better understanding of which FFM trait facets predicted trait-based creative potential when controlling for the other FFM facets in the same regression models. Semi-partial correlations are also reported, and represent the amount of *unique* variance shared between a given facet and the CP-PC. In regard to agreeableness, the facets of trust (r = -.11, p = .007), altruism (r = .16, p < .001), modesty (r = -.14, p = .001), and sympathy (r = .24, p < .001) remained significant predictors, while morality (r = -.04, p = .393) and cooperation (r = -.03, p = .519) did not. When extraversion facets predicted CP-PC scores, friendliness (r = .15, p = .002), gregariousness (r = -.13, p = .006), assertiveness (r = .16, p < .001), and excitement-seeking (r = .23, p < .001) were statistically significant, while activity level (r = .06, p = .135) and cheerfulness (r = .01, p = .870) were not. Finally, the

conscientiousness facets of self-efficacy (r = .23, p = < .001), orderliness (r = -.16, p < .001), achievement-striving (r = .19, p < .001), self-discipline (r = -.15, p .= 003), and cautiousness (r = -.11, p = .009) were significantly predictive of trait-based creative potential, while dutifulness was not (r = -.01, p = .795).

Next, each of the three higher order FFM traits were predicted from the CP-PC factor scores in simultaneous regression models (see Table 5.7). These analyses indicated that sensitivity (r = .43, p < .001), non-conformity (r = -.11, p = .012), independence (r = -.17, p < .001), and flexibility (r = .11, p = .025) were still significantly related to variance in agreeableness when controlling for all CP-PC dimensions simultaneously. In the same fashion, novelty (r = .50, p <.001), complexity (r = -.36, p < .001), and fluency (r = .18, p < .001) were predictive of extraversion. Awareness (r = .31, p < .001), novelty (r = -.19, p = .002), and complexity (r = -.34, p < .001) were predictive of conscientiousness. Because the only relationship that did not make intuitive sense was that between fluency and extraversion, a post hoc analysis was conducted using fluency scores as an outcome variable, the six extraversion scales as predictors, and the other seven creativity facets as controls in a multiple regression model. This analysis indicated that individuals high in creative potential related to fluency were more likely to be assertive (r = .07, p = .016), endorse a high activity level (r = .07, p = .011), and be cheerful (r = .13, p < .001). They were less likely to seek excitement (r = -.13, p < .001). They were not any more or less likely to be friendly (r = -.02, p = .535) or gregarious (r = .03, p = .389). As a comparison, using the same process and set of predictors, individuals high in complexity were significantly less likely to be gregarious (r = -.07, p = .049), assertive (r = -.11, p < .001), or cheerful (r = -09, p = .005), but no more or less likely to be higher or lower in the

other extraversion facets, while individuals higher in sensitivity simply tended to be friendlier *(r* = .10, *p* = .023) and less assertive (*r* = -.14, *p* <.001).

Discussion

Creativity is a complex and broad construct, with many sub-components and ways to conceptualize them (Abdullah & Cramond, 2018; Mumford & Gustafson, 1988). Though there is ample evidence that various aspects of creativity can be measured (or at least estimated), the complex and multifaceted nature of creativity poses challenges (Runco, 2004). Although the CP-PC showed high internal consistency based on the Cronbach's alpha value for the measure, discerning a clear factor structure was more difficult. Using 42 items from the measure in various CFA models resulted in poor model fit for a variety of structures, including a unidimensional model, an eight-factor model, a hierarchical model, and a bifactor model. When items with low communalities were removed and some of the items were allowed to cross-load onto secondary and tertiary factors in an eight-factor correlated traits model, model fit was better, though still not ideal. Alpha values for the subscales, as well as some of the factor loadings, were also often lower than would be desired. To an extent, these three findings make sense. The CP-PC was designed for broad coverage of traits that encompass domain-general potential for creativity or the potential to be creative in diverse ways that are sometimes overlooked (Shepard, 2019); such an approach can result in what appears to be lower reliability, but may instead be a reflection of the diversity of general and specific propensities that confer creative potential, including heterogenous profiles that may be difficult to capture using standard regression-based analytic approaches (Barbot et al., 2016). Each of the CP-PC items were also designed to measure a slightly different dispositional construct indicative of creative potential, to attempt broad coverage in fewer items than other creativity trait measures that also attempt broad coverage. As

such, items that are similar in quality on the CP-PC may not be as clearly related as would be the case when all items on a subscale have been designed to measure the *exact* same thing. For example, items on the complexity CP-PC subscale target personal complexity (Barron, 1955), overinclusive thinking (Eysenck, 1993), the retention of a childlike approach to situations (Torrance, 1979), simultaneous existence of paradoxical trait pairs (Csikszentmihalyi, 1996), fantasy-proneness (McCain, Gentile, & Campbell, 2015), and psychological-mindedness (MacKinnon, 1965). While these constructs should be indicative of a complex disposition, they will also be more loosely related than a subscale measuring any single one of the constructs.

Based on this sample, as well as items cross-loading on additional factors in the Shepard (2019) sample, it appears that variance in responding to a number of the CP-PC items is influenced by more than one latent variable, though in the absence of a hierarchical structure this does not appear to occur in the same manner for all of the items. Propensities for creativity have been proposed to work in a synergistic and overlapping fashion (Plucker & Beghetto, 2004), so this is also reasonable. For example, sensitivity may enable individuals to identify problems, sense gaps in information, and gain inspiration (Feist, 1999; Russ, 1993), as indicated by the three item cross-loadings that were modeled on the sensitivity factor. Fluency, at least that which is ideational in nature, is statistically related to the uniqueness of ideas, associative ability, and thinking across a number of conceptual categories (Barbot, 2018; Benedek, Könen, & Neubauer, 2012), as reflected by four of the cross-loaded items for that factor. The other items that were modeled to cross-loaded on the fluency factor are also reasonable. Fluency, by definition, should also be related to a tendency to think of new ways to do things (item 34) and likely involves being sensitive to one's environment for sources of inspiration (item 9). However, given the interrelated nature of creativity constructs, more cross-loadings than modeled in the present

study may be relevant; even if cross-modeled factor loadings are small that does not mean they are not meaningful.

A limitation of the CP-PC measure design is that by attempting broad coverage, there are many trait-constructs between which to attempt to elucidate relationships. Because factor analysis is typically best when there is simple structure regarding instrument constructs and given the apparent multiple factor loadings for items based on both this study and the Shepard (2019) study, it is possible that there will be continued difficulty in identifying a well-fitting factor structure. Furthermore, it is entirely possible that connections between the trait-constructs (as represented by the items) may vary some between samples, especially if one profession or another is targeted (e.g., artists versus scientists, or entrepreneurs versus clinicians; Barbot et al., 2016). In that regard, it is also possible that the results of the factor analyses were sample specific, though there did appear to be more commonalities than not when the Shepard (2019) dataset was run with the cross-loaded factor model. Still, because convenience sampling was used in the present study, the majority of the participants were female, Caucasian, and had advanced college degrees.

Given the results of the factor analyses and that a more exploratory approach than originally anticipated was taken, future research should continue to seek to understand the factor structure of the measure. If the measure is used in research or applied settings and the use of subscales is desired, it should be noted that items may be indicative of more than one latent construct; the extent to which this may be problematic can be determined in light of research questions, study design, or the intended use in practical settings. Still, the results of Shepard (2019) and the present study appear to indicate utility for the dimensional scales. Controlling for the other dimensions, Shepard (2019) found unique patterns of predictive validity for a number

of outcome variables, including a range of domain-specific creative behaviors. For example, complexity, non-conformity, and fluency predicted creative behavior in the domain of writing and language, while sensitivity and fluency predicted creative behavior specific to crafts.

Similarly, in the present study, specific facets of agreeableness, extraversion, and conscientiousness predicted the revised 39 item CP-PC measure scores. These results, compared to the zero-order correlations between the CP-PC and the three FFM trait measures, support the assertion that there may be suppression effects (and thus paradoxical relationships when trait facets are concerned) when attempting to ascertain relationships between creativity-specific variables and other traits (e.g., Fürst, & Lubart, 2016). In short, it should be noted that some effects, at the facet level, had opposing signs when the FFM facets were included in a simultaneous multiple regression model. This seems to support previous work that has indicated that such complexity of personality is indicative, if not a hallmark (or *the* hallmark) of creative individuals (e.g., Barron 1957; Csikszentmihalyi, 1996). In addition to the frequently referenced observations of Barron and Csikszentmihalyi, the results of the present investigation indicated that individuals who are overall higher in traits that confer creative potential are less trusting and modest, while still remaining altruistic and sympathetic, more friendly, but also less gregarious and more assertive, more self-efficacious and achievement-striving, yet less orderly, self-disciplined, or cautious, and higher in excitement seeking. These results are also notable in light of goals for the CP-PC (in contrast to a number of widely used measures of creative personality) being to include items that are also prosocial in nature, such as a tendency to experience empathy, items that are reflective of traits that confer potential for incremental creativity as opposed to more radical creativity or originality, and to not include items that would be most

related to creative success and not potential (e.g., motivation or persistence). That the (negative) modesty and (positive) achievement-striving facets still "popped," so to say, is interesting.

The results of the simultaneous regressions using the eight CP-PC factor scores to predict the three omnibus FFM trait scores were also informative. Sensitivity and flexibility positively predicted agreeableness, while non-conformity and independence were negative predictors. Novelty and fluency were positive predictors of extraversion, while complexity was negatively predictive. Conscientiousness was positively predicted by awareness, but negatively predicted by novelty and complexity. Aside from the fluency/extraversion relationship, these results were intuitive. Sensitive individuals should be more likely to be agreeable, for example (Graziano, Habashi, Sheese, & Tobin, 2007). Individuals who prefer novelty or who are more likely to behave in a manner that facilitates encounters with novel situations likely appreciate stimulation, which is consistent with extraverted individuals (Ludvigh & Happ, 1973; Rusting & Larsen, 1995). The awareness dimension of the CP-PC is reflective of a variety of ways to be aware of and approach problems; as conscientious individuals tend to be careful, focused, and proactive (McCrae & Costa, 1987), the relationship with awareness also makes sense. However, based on the brief follow-up investigation of the fluency-extraversion relationship, it also appears that the FFM trait facets may predict the specific trait-based creative potential dimensions differentially. Further investigations to explore such relationships could be informative.

Several limitations of the present study and directions for additional research have already been noted. Additionally, the analyses conducted between the CP-PC and the FFM traits were exploratory and the findings should be confirmed using other samples. The extent to and manner in which alpha levels should be adjusted in exploratory research is quite controversial (Rubin, 2017), and so the reader is left to make his or her own evaluation of the strength of the

findings in light of both *p* values and effect sizes. To that end, it should be kept in mind that the relationships in the multiple regressions, between the CP-PC and the FFM model traits, were generally small. Notable exceptions were the relationships between sensitivity and agreeableness (r = .43), novelty and extraversion (r = .50), complexity and extraversion (r = -.36), awareness and conscientiousness (r = .31), and complexity and conscientiousness (r = -.34). Still, these results help to illuminate what nuanced relationships may exist between creative potential and other traits, especially in light of the non-statistically significant zero-order correlations between the CP-PC and both agreeableness and conscientiousness.

A major limitation is the aforementioned lack of a clear factor structure for the CP-PC, though this has occurred for other creativity-specific measures (e.g., Runco, Plucker, & Lim, 2001) and cross-loadings have been relevant in commonly used personality measures (e.g., McCrae & Costa, 1987). In fact, Wright (2017), noted that "well validated personality inventories often fit poorly in CFA models (p. 20)" and suggested alternate approaches, such as bifactor models that allow all variables to potentially cross-load onto different specific factors. In this case, the researcher is specifying the existence of general and specific factors, but not constraining the specific factors to be orthogonal to each other. Following a similar line of reasoning, in regard to issues with simple structure in personality research, after testing a number of factor models based on widely used models of personality, Ashton et al. (2009) had the following to say:

> If (such) facet-level variables are sampled broadly, then some of those variables should be roughly univocal markers of their factors. But if the facet-level variables are also sampled with a view to assessing subjectively important personality traits—those likely to have the strongest associations with socially significant criterion variables—then

> personality inventories will include many blended variables, and most of these will represent same-signed blends of factors...The inclusion of such traits will produce some departure from orthogonality between the factor-level scales of the inventory, but the unique variance of those traits will allow better prediction of some important criteria. It would seem unwise to exclude from personality inventories a facet-level trait such as Fairness (i.e., moral integrity) merely because it represents a complex blend of Honesty-Humility, Conscientiousness, and Agreeableness, or a facet-level trait such as Anxiety merely because it represents a complex blend of Emotionality, low Extraversion, and low Agreeableness (p. 88).

In regard to creativity research, specifically, Barbot et al. (2016) have suggested more advanced analytic techniques that, among other things, partition variance that is unique to items into both error variance and creativity task-specific variance, for example. Such an approach could potentially be modified to fit future investigations into the structure of the CP-PC.

In the Shepard (2019) investigation, it was suggested that the CP-PC might have utility in applied settings, in terms of helping students, employees, managers, professors, and others learn how to better identify not only their own creative potential, but that of others. It was also suggested that a better understanding of creative potential (which numerous studies have found is apparently not completely intuitive; e.g., Sumners, Abdulla, Paek, & Runco, 2019), may help to reduce stigma around traits that can be helpful to creativity but may also be related to social, school, or employment difficulties (e.g., traits associated with non-conformity) and to increase the utilization of traits related to creative potential in effective ways. Runco (2017) pointed out the importance of targeting the development and actualization of creative potentials; in fact, he noted it as perhaps the most important target of creativity research. The CP-PC is a step toward

identifying creative potentials in a more nuanced manner, so that they can be better understood and cultivated. For example, an individual who shows high creative potential related to flexibility could use this information to learn how to better apply this to specific tasks in his or her day-to-day life or in professional or academic settings, which is consistent with approaches to strengths development that have been well researched in other sub-disciplines of psychology (e.g., Rath & Conchie, 2008). A professor with an independent or non-conforming student might gain insight into novel ways to structure assignments so that such traits can be utilized in a manner that is satisfying to both the student and the requirements of the course, and the student with self-knowledge may be better able to advocate for more appropriate assignments.

References

Abdulla, A. M., & Cramond, B. (2018). The creative problem finding hierarchy: A suggested model for understanding problem finding, *Creativity. Theories – Research - Applications, 5*, 197-229. doi: https://doi.org/10.1515/ctra-2018-0019

Ashton, M. C., Lee, K., Goldberg, L. R., & de Vries, R. E. (2009). Higher order factors of personality: Do they exist?. *Personality and Social Psychology Review*, *13*(2), 79-91. https://doi.org/10.1177/1088868309338467

Barbot, B., Besançon, M., & Lubart, T. (2016). The generality-specificity of creativity: Exploring the structure of creative potential with EPoC. *Learning and Individual Differences, 52,* 178-187. https://doi.org/10.1016/j.lindif.2016.06.005

Barron, F. (1955). The disposition toward originality. *The Journal of Abnormal and Social Psychology*, *51*, 478-485. https://doi.org/10.1037/h0048073

Barron, F. (1957). Originality in Relation to Personality and Intellect. *Journal of Personality*, *25*, 730–743. https://doi.org/10.1111/1467-6494.ep8930936

Barbot, B. (2018). The dynamics of creative ideation: Introducing a new assessment paradigm. *Frontiers in Psychology*, *9*, Article ID 2529. https://doi.org/10.3389/fpsyg.2018.02529

Batey, M., Chamorro-Premuzic, T., & Furnham, A. (2010). Individual differences in ideational behavior: Can the big five and psychometric intelligence predict creativity scores?. *Creativity Research Journal*, *22*, 90-97. https://doi.org/10.1080/10400410903579627

Batey, M., & Furnham, A. (2006). Creativity, intelligence, and personality: A critical review of the scattered literature. *Genetic, Social, and General Psychology Monographs*, *132*, 355-429. https://doi.org/10.3200/MONO.132.4.355-430

Batey, M., Furnham, A., & Safiullina, X. (2010). Intelligence, general knowledge and

personality as predictors of creativity. *Learning and Individual Differences*, *20*, 532-535. https://doi.org/10.1016/j.lindif.2010.04.008

Benedek, M., Könen, T., & Neubauer, A. C. (2012). Associative abilities underlying creativity. *Psychology of Aesthetics, Creativity, and the Arts*, *6*, 273-281. https://doi.org/10.1037/a0027059

Cangur, S. & Ercan, I. (2015). Comparison of model fit indices used in structural equation modeling under multivariate normality. Journal of Modern Applied Statistical Methods, *14*, 153-167. https://doi.org/10.22237/jmasm/1430453580

Csikszentmihalyi, M. (1996). *Creativity: The psychology of discovery and invention*. New York, NY, US: HarperCollins Publishers.

Eysenck, H. J. (1993). Creativity and personality: Suggestions for a theory. *Psychological Inquiry*, *4*, 147-178. https://doi.org/10.1207/s15327965pli0403_1

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, *2*, 290-309. https://doi.org/10.1207/s15327957pspr0204_5

Feist, G. J. (1999). The influence of personality on artistic and scientific creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 273-296). New York, NY, US: Cambridge University Press.

Foss, L., Woll, K., & Moilanen, M. (2013). Creativity and implementations of new ideas: do organisational structure, work environment and gender matter?. *International Journal of Gender and Entrepreneurship*, *5*, 298-322.

Furnham, A. (2017). Personality Traits, Personality Disorders, and Creativity. In G. Feist, R. Reiter-Palmon, & J. Kaufman (Eds.), *The Cambridge handbook of creativity and*

personality research (Cambridge Handbooks in Psychology, pp. 251-272). Cambridge: Cambridge University Press. doi:10.1017/9781316228036.014

Fürst, G., & Lubart, T. (2017). An integrative approach to the creative personality: Beyond the big five paradigm. In G. J. Feist, R. Reiter-Palmon, & J. C. Kaufman (Eds.), *The Cambridge handbook of creativity and personality research* (pp. 140-164). New York, NY, US: Cambridge University Press. https://doi.org/10.1017/9781316228036.009

Graziano, W. G., Habashi, M. M., Sheese, B. E., & Tobin, R. M. (2007). Agreeableness, empathy, and helping: A person × situation perspective. *Journal of Personality and Social Psychology, 93*, 583-599. https://doi.org/10.1037/0022-3514.93.4.583

Kaufman, S. B., Quilty, L. C., Grazioplene, R. G., Hirsh, J. B., Gray, J. R., Peterson, J. B., & DeYoung, C. G. (2016). Openness to experience and intellect differentially predict creative achievement in the arts and sciences. *Journal of Personality, 84*, 248-258. https://doi.org/10.1111/jopy.12156

Kenney, D.A. (2015, November 12). *Measuring model fit.* Retrieved from http://www.davidakenny.net/cm/fit.htm

Kerr B.K., & Vuyk M.A. (2013) Career development for creatively gifted students. In K.H. Kim, J.C. Kaufman, J. Baer, & B. Sriraman B. (Eds.), *Creatively gifted Students are not like other gifted students* (Advances in Creativity and Giftedness, Vol. 5, pp. 137-151). Sense Publishers, Rotterdam, The Netherlands.

King, L. A., Walker, L. M., & Broyles, S. J. (1996). Creativity and the five-factor model. *Journal of Research in Personality, 30,* 189-203. http://dx.doi.org/10.1006/jrpe.1996.0013

Ludvigh, E. J., & Happ, D. (1974). Extraversion and preferred level of sensory stimulation.

British Journal of Psychology, 65, 359-365. http://dx.doi.org/10.1111/j.2044-8295.1974.tb01410.x

Mackinnon, D. W. (1965). Personality and the realization of creative potential. *American Psychologist*, *20*, 273. https://doi.org/10.1037/h0022403

McCain, J., Gentile, B., & Campbell, W. K. (2015). A psychological exploration of engagement in geek culture. *PloS one, 10*(11), e0142200. https://doi.org/10.1371/journal.pone.0142200.

Maples-Keller, J. L., Williamson, R. L., Sleep, C. E., Carter, N.T., Campbell, W. K., & Miller, J. D. (2019). Using item response theory to develop a 60- item representation of the NEO PI – R using the International Personality Item Pool: Development of the IPIP – NEO – 60. *Journal of Personality Assessment*, *0*, 1–12. https://doi.org/10.1080/00223891.2017.1381968

McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology, 52*, 81-90. http://dx.doi.org/10.1037/0022-3514.52.1.81

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin, 103*, 27. https://.doi.org/10.1037/0033-2909.103.1.27

Plucker, J.A., & Beghetto, R.A. (2004). Why creativity is domain general, why it looks domain specific, and why the distinction doesn't matter. In R.J. Sternberg, E.L. Grigorenko & J.L. Singer (Eds.), *Creativity: From potential to realization* (pp. 153–168). Washington, DC: American Psychological Association.

Puryear, J. S., Kettler, T., & Rinn, A. N. (2017). Relationships of personality to differential

conceptions of creativity: A systematic review. *Psychology of Aesthetics, Creativity, and the Arts*, *11*, 59–68. https://doi.org/10.1037/aca0000079

Rath, T. & Conchie, B. (2008). *Strengths based leadership: Great leaders, teams, and why people follow*. New York: Gallup Press

Rubin, M. (2017). Do *p* values lose their meaning in exploratory analyses? It depends how you define the familywise error rate. *Review of General Psychology, 21,* 269-275. doi: 10.1037/gpr0000123

Runco, M. A. (2004). Everyone has creative potential. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 21–30). Washington, DC: American Psychological Association. https://doi.org/10.1037/10692-002

Runco, M. A. (2017). Comments on where the creativity research has been and where is it going. *Journal of Creative Behavior*, *51*, 308–313. https://doi.org/10.1002/jocb.189

Runco, M. A., Plucker, J. A., & Lim, W. (2001). Development and psychometric integrity of a measure of ideational behavior. *Creativity Research Journal, 13,* 393-400. https://doi.org/10.1207/S15326934CRJ1334_16

Russ, S. (1993). Affect and creativity: The role of affect and play in the creative process. Hillsdale, NJ: Erlbaum.

Rusting, C. L., & Larsen, R. J. (1995). Moods as sources of stimulation: Relationships between personality and desired mood states. *Personality and Individual Differences, 18,* 321-329. http://dx.doi.org/10.1016/0191-8869(94)00157-N

Schimmack, U. (2019, August 13). When personality psychologists are high [Blog post]. Retrieved from https://replicationindex.com/2019/08/13/when-personality-psychologists-are-high/

Shepard, A.C. (2019). *Accounting for complexity, domains, intrapersonal barriers, and contextual influences, oh my!: Validation of a new measure to identify trait-based creative potential.* Manuscript in preparation.

Silvia, P. J., Nusbaum, E. C., Berg, C., Martin, C., & O'Connor, A. (2009). Openness to experience, plasticity, and creativity: Exploring lower-order, high-order, and interactive effects. *Journal of Research in Personality*, *43*, 1087-1090. https://doi.org/10.1016/j.jrp.2009.04.015

Sumners, S., Abdulla, A., Paek, S., & Runco, M. (2019). *Creativity, what it is and what it is not: A study of implicit theories.* Manuscript submitted for publication.

Torrance, E. P. (1979). *The search for satori & creativity*. Buffalo, N.Y: Creative Education Foundation.

Von Stumm, S., Chung, A., & Furnham, A. (2011). Creative ability, creative ideation and latent classes of creative achievement: What is the role of personality?. *Psychology of Aesthetics, Creativity, and the Arts*, *5*, 107. https://doi.org/10.1037/a0020499

Wolfradt, U., & Pretz, J. E. (2001). Individual differences in creativity: Personality, story writing, and hobbies. *European Journal of Personality*, *15*, 297-310. https://doi.org/10.1002/per.409

Table 5.1

Description of Factors

Factor Name	Factor Description
1. Awareness	Reflective of both self-awareness and several types of problem-awareness or ways in which individuals approach problems *Sample item: 10.* ***In-tune.*** *You sense when something is wrong or could be improved.*
2. Novelty	Indicative of a sensitivity to or desire for trying new things, as well as preferences for novelty or unconventionality *Sample item: 29.* ***Adventurous.*** *You like the idea of exploring the unfamiliar.*
3. Complexity	Reflective of the presence of paradoxical trait pairs and a tendency to think or behave in a complex manner *Sample item: 28.* ***Multifaceted.*** *You can be different things at the same time - happy and sad, reckless and calculated...*
4. Sensitivity	Indicative of the tendency to engage with or notice internal or external stimuli *Sample item: 35.* ***Sensitive.*** *You are moved by the beauty or tragedy in things you encounter.*
5. Non-conformity	Indicative of a tendency to think, feel, or behave differently than others *Sample item: 3.* ***A Nonconformist.*** *You are not afraid to ruffle some feathers, to go against what the crowd is doing.*
6. Independence	Reflective of a preference to make choices or approach situations in a manner that is autonomous and otherwise self-directed *Sample item: 11.* ***Self-directed.*** *Even if there is a set way of doing something, you are likely to question or modify it.*
7. Flexibility	Indicative of curiosity about or the tendency to engage with a variety of subjects or activities, and a similar adaptability in terms of thinking and behavior. *Sample item: 14.* ***Open.*** *You are willing to consider strange or unique ideas or courses of action.*
8. Fluency	Reflective of the tendency to have many ideas and sources of inspiration, as well as the tendency to see oneself as creative. *Sample item: 26.* ***Full of Ideas.*** *You have so many ideas it sometimes feels like your ideas have ideas.*

Table 5.2

Descriptive Statistics for Major Study Variables

				Range	
Variable	*M*	*SD*	α	Potential	Actual
Initial CP-PC	203.48	26.07	.94	43-258	97-257
Initial CP-PCs	130.86	19.19	.93	28-168	67-168
Modified CP-PC	182.99	24.81	.93	39-234	86-233
Modified CP-PCs	125.56	18.82	.93	27-162	62-162
Agreeableness	48.55	5.43	.72	12-60	22-59
Extraversion	40.49	7.78	.82	12-60	22-60
Conscientiousness[a]	46.83	6.77	.79	12-60	24-60

Note. CP-PC = Creative Personality-Potential Composite; CP-PCs = Creative Personality-Potential Composite Short Form; Modified CP-PC = Results for CP-PC after four items removed based on factor analysis; Modified CP-PCs = Results for Creative Personality-Potential Composite Short Form after four items removed based on factor analysis.

[a]*n* for analyses using conscientiousness = 654. For all other analyses, *n* = 655.

Table 5.3

Model Fit Indices for CP-CP (n = 655)

Model	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA	SRMR	Λs
Unidimensional Model	2950.89***	819	3.60	.71	.70	.073(.071, .076)	.068	.32-.71
Eight-factor Model	2380.08***	791	3.01	.79	.77	.064(.061, .067)	.071	.34-82
Hierarchical Model	2457.55***	811	3.03	.78	.77	.064(.061, .067)	.071	.33-.82
Modified Eight-factor Model	1630.92***	656	2.49	.87	.85	.055(.051, .058)	.052	.17-.81

Note. CFI = Comparative Fit Index; TLI = Tucker Lewis Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; λs = Lambdas (standardized factor loadings, including values for cross-loadings).
*** $p < .001$.

Table 5.4

Standardized Factor Loadings and Cross-loadings for Confirmatory Model (n = 655)

Item	Factor Loadings							
	1	2	3	4	5	6	7	8
1. Awareness								
5. Perceptive. You notice things. Details that others miss are obvious to you.	**.33**			(.17)				
10. In-tune. You sense when something is wrong or could be improved.	**.43**			(.25)				
18. Integrative. You find connections between different ideas and concepts, even if they don't seem related at first.	**.38**							(.37)
20. Thoughtful. You try to understand how things have been done before, so that you can improve upon them.	**.52**							
21. Aware. You can identify solutions for problems that haven't been figured out.	**.67**							
31. A Noticer. You pay attention to the unexpected - things that are surprising, novel, unique.	**.56**							
38. A Unique Thinker. Others find your ideas surprising, but to you they seem obvious.	**.37**							(.42)
39. Divergent. You easily think of multiple perspectives from which to view problems or situations.	**.69**							
40. An Improver. You see ways to make others' ideas better.	**.62**							
2. Novelty								
13. An Explorer. You try or consider many ways of doing things.	(.43)	**.36**						
16. Playful. You enjoy banter, cleverness, and life being game-like.		**.24**					(.30)	
29. Adventurous. You like the idea of exploring the unfamiliar.		**.78**						
30. Boundary-breaking. You enjoy pushing boundaries in what you do.		**.36**			(.55)			
33. Broad-minded. You enjoy solving problems with multiple possible answers more than those with just one correct answer.	(.48)	**.25**						
34. Unconventional. You think of new ways to do things, like use words or change your appearance.		**.29**	(.31)					(.18)
43. A Novelty Seeker. You get restless always doing the same old thing.		**.64**						
3. Complexity								
7. Complex. The are many different sides to who you are.			**.56**					
12. A Divergent Thinker. Your thought process goes in many different directions.			**.33**					(.35)
27. Childlike. You ask a lot of questions, and don't take initial explanations for granted.			**.54**					
28. Multifaceted. You can be different things at the same time - happy and sad, reckless and calculated...			**.57**					
36. A Daydreamer. You regularly get lost in thoughts and reflection.			**.50**					

Table 5.4 (Continued)

Item	Factor Loadings							
	1	2	3	4	5	6	7	8
37. Psychologically-minded. You explore connections, patterns, and deeper meanings.	(.40)		**.28**					
4. Sensitivity								
9. Connected. You respond strongly to things like music, art, and nature.				**.36**			(.21)	(.18)
35. Sensitive. You are moved by the beauty or tragedy in things you encounter.				**.79**				
42. Empathetic. It is easy for you to feel the pain and joy of others.				**.68**				
5. Non-conformity								
1. Different. You are not like most other people.					**.38**			
3. A Nonconformist. You are not afraid to ruffle some feathers, to go against what the crowd is doing.					**.63**			
8. Fluid. You do not fit into stereotypes or social prescriptions of being one thing or another.			(.37)		**.26**			
6. Independence								
11. Self-directed. Even if there is a set way of doing something, you are likely to question or modify it.						**.68**		
23. Independent. You prefer to disregard rules that don't make much sense.						**.65**		
25. Autonomous. You enjoy doing things your own way, figuring out your own path.						**.61**		
7. Flexibility								
14. Open. You are willing to consider strange or unique ideas or courses of action.					(.31)		**.39**	
15. Curious. You engross yourself in new information, activities, or hobbies.							**.80**	
32. Evolving. You actively look for ways to learn and grow.	(.30)						**.35**	
41. Interested. You like to learn about many different topics, from watch-making to marine biology.							**.61**	
8. Fluency								
2. Creative. You think or act in a creative fashion.								**.72**
17. Imaginative. You think of lots of new ideas and possibilities.								**.81**
19. Inspired. You can find inspiration everywhere, even in everyday things.				(.28)				**.43**
26. Full of Ideas. You have so many ideas it sometimes feels like your ideas have ideas.								**.81**

Note. Primary factor loadings are indicated with bold text, while the modeled cross-loadings are indicated with parentheses. Other factor loadings are omitted from the table.

Table 5.5

Bivariate Correlations of Major Study Variables

Variable	CP-PC	CP-PCs	Agreeableness	Extraversion
CP-PCs[a]	.80***			
Agreeableness	.07	.06		
Extraversion	.30***	.32***	.08*	
Conscientiousness[b]	-.03	-.01	.20***	.26***

Note. CP-PC = Creative Personality-Potential Composite (modified version); CP-PCs = Creative Personality-Potential Composite Short Form (modified version).

[a]Correlation was calculated between the CP-PCs score and the CP-PC items that were not used on the CP-PCs.

[b]*n* for analyses using conscientiousness = 654. For all other analyses, *n* = 655.

* $p < .05$. *** $p < .001$.

Table 5.6

Simultaneous Multiple Regressions for Agreeableness, Extraversion, and Conscientiousness Facets Predicting Total CP-PC Scores

Variable	*B*	*SE*	β	*sr*
Regression One (*n* = 655)				
(intercept)	153.02***	9.37		
Trust	-1.58	.58	-.11**	-.10
Morality	-.75	.88	-.04	-.03
Altruism	3.37	.88	.16***	.14
Cooperation	-.41	.64	-.03	-.02
Modesty	-1.72	.50	-.14**	-.13
Sympathy	3.99	.69	.24***	.22
R^2		.11		
F		13.22***		
Regression Two (*n* = 655)				
(intercept)	137.64***	5.38		
Friendliness	1.74	.56	.15**	.11
Gregariousness	-1.45	.52	-.13**	-.10
Assertiveness	2.01	.49	.16***	.15
Activity Level	.72	.48	.06	.06
Excitement Seeking	2.99	.56	.23***	.19
Cheerfulness	.10	.64	.01	.01
R^2		.13		
F		16.16***		
Regression Three (*n* = 654)				
(intercept)	157.28***	8.25		
Self-efficacy	3.99	.83	.23***	.18
Orderliness	-1.59	.42	-.16***	-.14
Dutifulness	-.22	.86	-.01	-.01
Achievement Striving	3.47	.79	.19***	.16
Self-Discipline	-2.00	.66	-.15**	-.11
Cautiousness	-1.32	.51	-.11**	-.10
R^2		.09		
F		11.01***		

Note. Regression One used all facets from the agreeableness scale, Regression Two all facets from the extraversion Scale, and Regression Three all facets from the conscientiousness scale. All of the regressions predicted CP-PC scores. *sr* = semipartial correlation. If the beta value is statistically significant, the semipartial correlation is as well.
** p < .01. *** p < .001.

Table 5.7

Simultaneous Multiple Regressions for CP-PC Dimensions Predicting Agreeableness, Extraversion, and Conscientiousness

Variable	*B*	*SE*	β	*sr*
Agreeableness (*n* = 655)				
(intercept)	39.96***	1.63		
Awareness	.01	.05	.02	.01
Novelty	-.07	.05	-.08	-.05
Complexity	-.01	.06	-.01	-.01
Sensitivity	.91	.09	.43***	.37
Non-conformity	-.22	.09	-.11*	-.09
Independence	-.34	.09	-.17***	-.13
Flexibility	.19	.09	.11*	.08
Fluency	.02	.07	.01	.01
R^2		.21		
F		21.66***		
Extraversion (*n* = 655)				
(intercept)	29.08***	2.26		
Awareness	.11	.07	.09	.06
Novelty	.63	.07	.50***	.31
Complexity	-.56	.08	-.36***	-.25
Sensitivity	.06	.12	.02	.02
Non-conformity	-.17	.12	-.06	-.05
Independence	-.23	.12	-.08	-.06
Flexibility	.06	.12	.02	.02
Fluency	.35	.10	.18***	.12
R^2		.26		
F		28.98***		
Conscientiousness (*n = 654)*				
(intercept)	43.39***	2.16		
Awareness	.35	.06	.31**	.21
Novelty	-.20	.06	-.19**	-.12
Complexity	-.46	.07	-.34***	-.23
Sensitivity	.05	.11	.02	.02
Non-conformity	-.05	.11	-.02	-.02
Independence	.18	.12	.07	.06
Flexibility	.20	.11	.09	.07
Fluency	.06	.09	.03	.02
R^2		.11		
F		10.05***		

Note. CP-PC = Creative Personality-Potential Composite; *sr* = semipartial correlation. If the beta value is statistically significant, the semipartial correlation is as well.
* p < .05. ** p < .01. *** p < .001.

Appendix 5A

Refined[1] Creative Personality-Potential Composite (CP-PC)

Shepard, 2019

Instructions. Now, you will see 39 descriptors that may or may not fit with how you see yourself. Consider how well each of these describes who you are. This might be different from your actual behavior in some situations. That is okay, just select the response that you think best describes your truest self. Please select an answer for each question, even if you need to approximate.

Please rate the extent to which each of the following describe who you are:[2,3]

1. Different. You are not like most other people.

***2. Creative.** You think or act in a creative fashion.

***3. A Nonconformist.** You are not afraid to ruffle some feathers, to go against what the crowd is doing.

5. Perceptive. You notice things. Details that others miss are obvious to you.

7. Complex. There are many different sides to who you are.

***8. Fluid.** You do not fit into stereotypes or social prescriptions of being one thing or another.

***9. Connected.** You respond strongly to things like music, art, and nature.

10. In-tune. You sense when something is wrong or could be improved.

***11. Self-directed.** Even if there is a set way of doing something, you are likely to question or modify it.

[1] Measure items are presented based on the removal of items from the final factor model for the study.
[2] Item numbering has not been changed so that the measure can be easily compared to the results as described in the text.
[3]When an item number is preceded by an asterisk, that item is also part of the short-form of the measure (CP-PCs).

***12. A Divergent Thinker**. Your thought process goes in many different directions

***13. An Explorer.** You try or consider many ways of doing things.

***14. Open**. You are willing to consider strange or unique ideas or courses of action.

***15. Curious.** You engross yourself in new information, activities, or hobbies.

16. Playful. You enjoy banter, cleverness, and life being game-like.

***17. Imaginative.** You think of lots of new ideas and possibilities.

***18. Integrative**. You find connections between different ideas and concepts, even if they don't seem related at first.

***19. Inspired.** You can find inspiration everywhere, even in everyday things.

20. Thoughtful. You try to understand how things have been done before, so that you can improve upon them.

***21. Aware.** You can identify solutions for problems that haven't been figured out.

23. Independent. You prefer to disregard rules that don't make much sense.

***25. Autonomous.** You enjoy doing things your own way, figuring out your own path.

***26. Full of Ideas.** You have so many ideas it sometimes feels like your ideas have ideas.

***27. Childlike.** You ask a lot of questions, and don't take initial explanations for granted.

***28. Multifaceted.** You can be different things at the same time - happy and sad, reckless and calculated...

***29. Adventurous.** You like the idea of exploring the unfamiliar.

***30. Boundary-breaking.** You enjoy pushing boundaries in what you do.

***31. A Noticer.** You pay attention to the unexpected - things that are surprising, novel, unique.

***32. Evolving.** You actively look for ways to learn and grow.

***33. Broad-minded.** You enjoy solving problems with multiple possible answers more than those with just one correct answer.

***34. Unconventional.** You think of new ways to do things, like use words or change your appearance.

***35. Sensitive.** You are moved by the beauty or tragedy in things you encounter.

36. A Daydreamer. You regularly get lost in thoughts and reflection.

37. Psychologically-minded. You explore connections, patterns, and deeper meanings.

***38. A Unique Thinker.** Others find your ideas surprising, but to you they seem obvious.

***39. Divergent.** You easily think of multiple perspectives from which to view problems or situations.

***40. An Improver.** You see ways to make others' ideas better.

41. Interested. You like to learn about many different topics, from watch-making to marine biology.

42. Empathetic. It is easy for you to feel the pain and joy of others.

43. A Novelty Seeker. You get restless always doing the same old thing.

Scale anchors: (1) Not at all like me **(2)** Somewhat unlike me **(3)** A little unlike me **(4)** A little like me **(5)** Somewhat like me **(6)** Exactly like me

CHAPTER 6

SUMMARY AND GENERAL DISCUSSION

The aim of the studies described in this manuscript was to explore the psychometric properties of a new measure to identify creative potential conferred by personality traits that have been associated with creative thought and behavior. The measure was developed with the goal of providing an complementary alternative to other measurement tools available at present. As such, a number of possible limitations associated with other measures were addressed. Items that would span various ways to have creative potential were included, and issues with requiring behavioral consistency were considered, for example.

In 2004, in an article by the same name, Runco made a strong case for the assertion that everyone has creative potential. The results of the three studies in this manuscript seem to provide further confirmation of this premise. No participant received the lowest possible score on the measure in any of the three samples. In fact, to varying degrees, the distributions of measure scores had some negative skew (though the extent to which response biases may have influenced this could be explored in future studies). The Cronbach's alpha values for the measure across the three studies, indictive of internal consistency reliability, ranged from acceptable to excellent at .77 for the pilot study, .96 in the second validation study, and .93 in the third study. The short-form of the CP-PC, the CP-PCs, showed a similar degree of reliability, with alpha values of .95 and .93 in the second and third studies. The reliability of the measure subscales, formed based on the results of the factor analyses, were lower, and ranged from .68-.91 in the second study and .58-.83 in the third study; the dimension of non-conformity evidenced the lowest internal

consistency in both studies. This appears to indicate that the items that form this subscale are less closely related than the items that form the other subscales. However, given the CP-PC was designed to provide a measurement of 43 trait-constructs related to creativity, it was initially unclear if any interpretable subscales would emerge at all.

CP-PC scores predicted a wide range of creativity and personality-specific variables in a pattern that would be expected across the studies, indicating convergent, construct, incremental, and discriminant validity. The measure significantly predicted ideational behavior (studies one and two), openness to experience as measured in regard to the HEXACO conceptualization of personality (study one), openness to experience and intellect as measured according to the BFAS conceptualization of personality (studies one and two), the total score of creative activity and accomplishment (studies one and two), creative behavior in three domains of everyday creativity, as well as the domains of writing and language, music and visual arts, and math and science (study two), social recognition for creative behavior (study two), and creative personal identity and creative self-efficacy (study two). The CP-PC showed the ability to discriminate between openness to experience and neuroticism (study two), and evidenced relationships with trait agreeableness, extraversion, and conscientiousness that were similar to those that had been found in a previous meta-analysis looking at several types of creativity measures (study three). The one notable unexpected relationship was the strength between CP-PC scores and creative self-efficacy. This relationship was clarified with the use of an exploratory moderation analysis, which indicated that the relationship between creative potential and creative behavior was not statistically significant for individuals who were lowest in creative self-efficacy. CP-PC scores also predicted creative behavior above and beyond the two openness conceptualizations in all but one case (studies one and two), and the measure evidenced incremental predictive validity above

and beyond openness to experience when ideational behavior and creative personal identity were the criterion variables (studies one and two).

At the facet level, the CP-PC evidenced the ability to differentially predict outcome variables. Flexibility, for example, was a unique predictor of openness to experience, whereas fluency and novelty were the most typical predictors of actual creative behavior, with alternating dimensions showing relevance based on the domain of creative behavior examined (e.g., sensitivity predicted scores in the crafts domain of everyday creativity). This finding, for novelty, appeared to be supported in the final study, where its unique relationship with extraversion, typically associated with activity and a desire for stimulation, was identified. In the earlier study, fluency was proposed to represent a core creativity factor, so the novelty/fluency relationship that appears to be indicated in terms of influencing creative behavior is logical. In the simultaneous multiple regressions, complexity was the only positive predictor of neuroticism, which provided some interesting directions for future research. This finding appeared to be supported in study three, where complexity was found to negatively predict conscientiousness in the simultaneous regression models using CP-PC factor scores. The awareness dimension of the CP-PC was uniquely predictive of both creative self-efficacy and conscientiousness, which would seem to suggest that individuals high in this area of potential are likely to have more positive self-beliefs and a propensity for goal-directed behavior. The independence dimension did not positively predict any of the outcome variables in the multiple regressions in study two, which raised the question of whether it might better predict creativity that was more radical in nature. In the final study, the independence dimension negatively predicted agreeableness in a simultaneous regression model, which lends support to it being a valid indicator of the construct it is intended to measure. Nonconformity was associated with low agreeableness and with

creativity in writing and language and in music and visual arts, which would be expected based on both what non-conformity entails and prior research on artistically creative individuals. It was also indicative of a higher degree of identifying as creative, which may indicate that individuals who value creativity as part of their identity also see themselves as different and likely to go against the crowd. This premise has actually already been suggested on the basis of early research on creativity (Mumford & Gustafson, 1988), so the results are again consistent with what would be expected. In short, while the zero-order correlations between the CP-PC and the outcome variables appear to support the use of the total score as a reliable and valid indicator of trait-based creative potential, the results of the simultaneous multiple regressions appear to support the validity of the of subscales as useful and relevant predictors of meaningful outcomes. The presence of suppression effects, when constructs were examined at the factor or facet level, was noted in studies two and three, which implied utility of such nuanced approaches in future research involving creativity and personality/potential.

The factor analyses provided more ambiguous results in terms of whether the CP-PC is best considered unidimensional, multidimensional, or some combination of the two. The exploratory factor analysis in the pilot study indicated issues with the factor structure, as evidenced by the low Kaiser-Meyer-Olkin value, the presence of Heywood cases, and a number of items changing factors depending on how the data were modeled. However, the sample was small. The second study, also using exploratory factor analysis, provided (upon model rotation) evidence of eight interpretable correlated factors and enough item cross-loadings to justify exploring whether a general factor or higher order factor was present. However, this lack of simple structure was not adequately explained by hierarchical or bifactor models in the third study. Instead, testing a model with several cross-loading improved model fit, but the fit of the

final model was still not ideal. It is possible that more complex analyses may be necessary to discern the factor structure of the CP-PC. Several possible explanations for the issues that arose were suggested in the discussion section of study three. This includes the fact that the CP-PC was not initially designed based on a-priori factors; instead, relevant trait-constructs were identified, items were based on these, and sets of the items appeared to have enough in common to hang together reasonably well. I have previously suggested that the use of the CP-PC factor scales should be undertaken with this limitation in mind. However, the inclusion of a wide range of constructs is also a strength; if the goal is to capture the diverse ways that creative potential can exist, then construct coverage seems to deserve pride of place over model fit. The results of the many regression analyses assuage some concerns about validity and reliability that might result from the factor analyses, but future research should be conducted to elucidate whether better models might be specified. This could also be of benefit to better understanding the nature of creative potential.

On that note, a limitation of the studies is that they were largely exploratory. Although results appear to be consistent with what would be expected based on theory and research, replication would be beneficial to increase confidence in results and to ensure that the identified effects are consistent across samples. With the use of the undergraduate participant pool in study one and a convenience sample in study three, sample demographics were not consistent with the general population, though they did appear to be more balanced with the MTurk sample in study two. For whatever reason, in the third study, women seemed to be more likely to take the survey than men. It is possible that this is reflective of a higher level of agreeableness in women (which would likely influence voluntary survey responding), an identification with researcher demographic characteristics, or groups who happened to be most likely to see the survey. The

results of studies two and three did appear to indicate that the CP-PC was equally good at detecting creative potential across genders and ages, though there was a slight positive relationship with age in the third study. It is possible that individuals could become more comfortable with non-conformity over time or could develop an increased sensitivity to others. It is also possible that there could be cohort effects (see Schimmack, 2019). Such possibilities could be explored in subsequent research. It might also be of interest to better understand creative potential in gender non-conforming individuals (or in individuals who are non-conforming in regard to preferring not to respond to demographic survey items, at that), given the mean differences in the CP-PC scores for different groups in the third study and past research that has suggested that constructs such as psychological androgyny are empirically related to a predisposition for creativity (Norlander, Erixon, & Archer, 2000).

There are indeed a number of future directions that research on, or using, the CP-PC could take. Many have been suggested in the preceding chapters, including longitudinal studies to see whether scores remain stable over time, and the use of more diverse methods, such as item-response theory-based approaches or the fitting of factor models on which different constraints are imposed or removed. The final factor solution from study three could also be retested with the simpler hierarchical or bifactor solutions, as this was not done and several items were removed after the initial tests. Mixed-methods approaches could be useful in elucidating respondents' opinions regarding the extent to which CP-PC items represent their own creative potential, whether expressed or unexpressed. This could be approached with follow-up interviews or open-ended survey items in future research. Quantitatively, other outcome variables could be explored, including a wider range of real-world creative behaviors. Whether

the CP-PC might be useful if modified for use as an observer report tool, or for use with younger populations, could also be explored.

There may also, perhaps most importantly, be practical applications. A relatively short tool to identify a range of components of creative potential in adults may help to assist individuals in actualizing their own creative potential and that of others. The CP-PC could be beneficial in providing a framework by which laypersons could better understand the various traits that confer creativity and how they might manifest. In fact, there seemed to be notable interest in understanding the study and the measure when it was taken by individuals from the final sample. Although this is certainly not empirical evidence, there *were* a number of emails and social media comments and messages expressing interest and requesting more information. Given that the survey was voluntary, and so participants had already donated their time to completing it, the unsolicited follow-up responses appear to indicate that the CP-PC may resonate with the interests and experiences of individuals outside of the academic community. However, it is also important to note that any use of the measure (or its short-form version) should be commensurate with the amount of research conducted thus far, and the limitations discussed herein should be considered not only in future research studies, but also in regard to practical applications. It is of equal importance to recognize that psychological measures (and scores derived from measure factors) provide only *estimates* of where a given individual falls in regard to the constructs an instrument intends to measure. So, this should be kept in mind as well.

References

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin, 103*, 27. https://.doi.org/10.1037/0033-2909.103.1.27

Norlander, T., Erixon, A., & Archer, T. (2000). Psychological androgyny and creativity: Dynamics of gender-role and personality trait. *Social Behavior and Personality, 28*, 423–436. https://doi.org/10.2444/sbp.2000.28.5.423

Runco, M. A. (2004). Everyone has creative potential. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realization* (pp. 21–30). Washington, DC: American Psychological Association. https://doi.org/10.1037/10692-002

Schimmack, U. (2019, July 27). Personality change in the MIDUS [Blog post]. Retrieved from https://replicationindex.com/2019/07/27/personality-change-in-the-midus/